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# Building knowledge in performance measurement and management: A critical realist approach

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**Thesis title:**

# Building knowledge in performance measurement and management: A critical realist approach

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*Dedicated my family, questioning reality and bucking the system for the good of humanity.*

## Acknowledgments

# Contents

vii

# List of Tables

# List of Figures

# Chapter 1

# Introduction

Measurement and its potential for *management*–the subject of this text–holds fundamental importance within management science. Drucker (1986) called measurement one of the five basic tasks of the manager, an essential tool to guide the organization towards success. Long before Drucker, some of the first experiments in management science involved Taylor (1911) measuring the performance of ore shovelers as a means of improving not just organizational performance but also their individual well-being:

> A long series of experiments, coupled with close observation, had demonstrated the fact that when workmen of this caliber are given a carefully measured task, which calls for a big day's work on their part, and that when in return for this extra effort they are paid wages up to 60 per cent beyond the wages usually paid, that this increase in wages tends to make them not only more thrifty but better men in every way; that they live rather better, begin to save money, become more sober, and work more steadily.

Measurement, it seems, has wonderful potential to improve organizations and the individuals within them.

Given the centrality of the topic to management and organizational studies, it is perhaps unsurprising that the study of measurement for im-

provement has become a discipline in its own right (Bititci *et al.*, 2012). A significant body of literature has emerged—Neely (2005) identify 1,352 papers with the words "performance measurement" in the title—and continues to be a topic of interest to management scholars, stemming from a wide range of fields and applied within and across disciplines (Altin *et al.*, 2018; Franco-Santos *et al.*, 2012). The general interest of these studies is what will be referred to in this text as performance measurement and management (PMM), *i.e.* measuring performance *in order to* achieve positive outcomes.

The interest in measurement has brought about its own challenges. While emerging as management topic of its own right, the wide-ranging backgrounds and perspectives that inform research on PMM have led to disagreements on what PMM is, on what it is meant to do and how, and even about the nature of the world in which it takes place. Even the word "performance" can be controversial, and researchers take many approaches to defining and researching it (Richard *et al.*, 2009). Further, there is recognition that the theories that informed the major PMM developments in the late 1980s and early 1990s that increased attention to the field, *e.g.*, the Balanced Scorecard (Kaplan and Norton, 1992), may not be adequate enough to develop interventions in the changing context of the 21st century (Bititci *et al.*, 2012).

A part of the issue, and a central topic of the chapters to follow, is that much PMM research lacks sufficient consideration of underlying philosophical assumptions (Micheli and Mari, 2014). These are the implicit assumptions about what the world is like and how we as humans can learn about it.

PMM has strong empiricist roots, and this remains the dominant, if implicit, approach (Micheli and Mari, 2014). Another stream tends towards strong interpretivism, which stresses understanding meaning and nuance. As will be discussed later, these approaches may present the researcher with logical inconsistencies when attempting to build knowledge—explanations of how PMM works, for whom it works, and in what circumstances (Pawson, 2013; Smith and Johnston, 2014)—

but also to bring about positive change in practice. That is, insufficient philosophical discussion can lead the researcher toward reductionism, in which case implementations are more likely to fail (see Mingers (1984) or Checkland (1983), for a discussion), or towards strong interpretivism, where knowledge building becomes problematic.

Therefore, to address these inconsistencies, the overall objective of these chapters is to consider a critical realist perspective of PMM. Critical realism is a philosophical approach which originated with the works of Bhaskar (1975, 1979, 1986, 1993, 2016), largely in response to what is described as the *epistemic fallacy* of empiricism, confounding ontology with epistemology. Critical realism has since developed to address a number of philosophical issues, and especially those relating to the philosophy of science.

## 1.1 What is critical realism?

Critical realism begins by separating ontology—the study of being— from epistemology—the nature of knowledge. In other words, it separates questions of *what is* from questions of *how we (humans) know*. Further, it supposes a realist ontology, that there is a reality that exists beyond any awareness of it. These ideas may seem trivial, and yet, as Collier (1994) puts it:

> it might be thought that realism is too obviously true to be worth saying; or it might be thought that anything so obvious to commonsense is probably false... Oddly, these two objections are often combined: realism is *both* dismissed as obvious, *and* replaced by a non-realist account which is supposedly less 'naive'. Collier, 1994, pp. 3

Likely the most distinguishing feature of Bhaskar's (1975) early writing is that it places causality at this *real* level, as opposed to positivism, where it lies at the level of observable events. That is, a Humean account of causality holds that a certain Event A may cause Event B if they occur together, and seeks to identify conjunctions of events in order to arrive at law-like statements about the universe (Bhaskar, 1975).

Further, identifying causal relations with empiricism rests on being able to reliably *capture* these events. Both of these positions are problematic for knowledge building, especially in the social sciences, which must deal not just with physical entities but also the meaning given to these, in addition to social structures.

In the place of a "constant conjunctions" account of causality, critical realism proposes that entities have causal powers, and that events may come about via *generative mechanisms* which may or may not act (Bhaskar, 1975). These mechanisms, described in detail in Chapter 3, are conditioned by existing physical and social structures. They also often operate simultaneously and at different levels[1], making their isolation and identification problematic. This difficulty is perhaps *the* central challenge of operating in open systems.

Another feature of critical realism that guides the next chapters is what Bhaskar (2016) refers to as the "Holy Trinity" of critical realism: the realist ontology alluded to in the paragraphs above, epistemological relativism, and judgmental rationalism. What this means is although as (social) researchers we have the difficult task of uncovering mechanisms operating (or not) in open systems, there is no one means of discovery or methodology that is *a priori* suited to the task. Critical realism recognizes science as a knowledge object, and so, interminably corrigible—this includes critical realism itself (Bhaskar, 2016).

However, fallibilism and a recognition of interpretation does not mean that methods or conclusions stemming from a study will equally approximate the real: we may judge some conclusions more valid than others. This apparent "middle ground" between interpretivism and strong empiricism has appealed to a number of management researchers, but is also often misunderstood or used inappropriately to justify a particular methodological position, particular findings, or using fallibilism as a defense for a lack of results (Contu and Willmott, 2005). Therefore, there is both a need to proceed with caution when discussing critical realism

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[1]The concept of "level" in critical realism differs from many accounts in management and organizational studies. An illustration drawing from the research contained in this thesis has been included in Appendix A.

and to further develop arguments in the context of different fields of study.

A final element of critical realism that will appear throughout this text is that it tends to ask *retroductive* questions to learn about the world. That is, it asks "what must the world be like for X to be true?" , where X is some outcome of interest. Beginning with this type of question has serious implications for describing scientific discovery and leads Bhaskar (1993) to propose that it follows an approach of *description*, *retroduction* of possible antecedent underlying mechanisms, *elimination* of implausible or unlikely explanations, *identification* of mechanisms, and possible *correction* of the existing knowledge base. This *DREI* or *DREIC* process has been expanded to *RRREIC* for applied work to include *redescription*, *resolution*, and *retroduction* or *retrodiction*, essentially, fitting existing knowledge of to explain a given outcome. The RRREIC model is described further in Chapter 2.

Deliberately considering in these processes to learn about PMM is a major aim of the thesis and will be discussed in subsequent chapters. Importantly, it has been argued that the processes of induction, deduction, and abduction logically fit into the process of discovery described above (*e.g* Chiasson, 2005), whereas when performed alone a researcher may encounter logical conundrums, *e.g.* the Paradox of the Raven and other issues of confirming or falsifying hypotheses with induction and deduction alone (Hempel, 1945). Critical realism holds that these difficulties stem from reducing reality to empirical events.

However, there are a few additional challenges in exploring critical realism which must be addressed before continuing. There is a significant deal of confusion around critical realism and its meaning amongst scholars, perpetuated at least in part by disagreements among critical realists (Brown and Roberts, 2014). Therefore, it is important to clarify a few issues.

First, it must be recognized that critical realism is not the only realism, and debates exist regarding several points and especially around Bhaskar's later works on dialectical Critical Realism (Bhaskar, 1993) and

MetaReality (Bhaskar, 2016). Many methodological textbooks that are likely familiar to researchers (*e.g.* Cook and Campbell (1979)) adopt a realist position which may share similarities to certain aspects of critical realism, especially ideas found in Bhaskar (1975). The common element in these texts is an insistence on separating questions of ontology from those of epistemology, *i.e.* of avoiding the epistemic fallacy.

However, there are significant differences on a range of issues such as how they consider a mechanism (Mingers and Standing, 2017), the role of agency (Porter, 2015), the use of quantitative methods (Sayer, 1992), and the aim of science (Bhaskar, 2016), to name a few. So, researchers referring to critical realism may refer to different concepts, or a particular element of a particular branch of critical realism. Criticisms of critical realism often fail to keep up with the refinements to Bhaskar's ideas, particularly those developed after *Plato, etc.* (Bhaskar, 1994). At least part of the reason for the lack of understanding is that several of the works during the early 1990's where notoriously poorly written and used restrictive jargon (Collier, 1994).

Therefore, before entering into a deeper discussion of the consequences of adopting a critical realist approach to studying PMM, the distinctive features of the type described in *this* text will be discussed. First, the following chapters center mainly on what Bhaskar (2010) describes as "first-wave" critical realism, *i.e.* the immediate implications of setting out to avoid mixing questions of "what is" versus "how do we know", and the critical realist ontology of generative mechanisms (as opposed to Humean causality), conditioning structures, and stratification (levels). Thus, some important developments within critical realism pertaining to the nature of change, the aims of science, language, and much of the subject of dialectics must be ignored or greatly simplified. This reduced focus was necessary to give adequate attention to the topic in relation to PMM, a field which has yet to be considered from such a perspective.

Second, though the discussion of critical realism itself is limited, it does seek to adhere to a "Bhaskarian" take on critical realism, and to adopt its principles, recognizing that some of these are not universally

accepted (*e.g.* Pawson, 2013). These principles are, as Bhaskar (2016) describes, i) that it should act as a philosophical underlaborer for science and practice, ii) that it is serious in a Hegelian sense in unifying theory and practice, iii) that it uses *immanent critique*, *i.e.* that criticism should involve something intrinsic to what is being criticized, iv) that philosophy is making assumptions about the world explicit, v) that the aim of science should be increasing reflectivity and/or transforming practice, (vi) that theories and principles (including critical realism) should not be accepted on authority alone, but rather be tested in everyday practice, and (vii) that the possibility of change is real, *i.e.* that transformative change is possible and can be sought to increase well-being.

## 1.2 What does critical realism add to this research?

Critical realism may be especially well positioned to address the challenges faced by PMM. This thesis benefits from using critical realism in two primary ways. First, in conceiving of what PMM must be like (*i.e* the *ontology* of PMM), and second, in developing ways to learn about PMM.

First, in addressing issues of ontology, critical realism can help in attempting to consider multiple, stratified, emergent layers of reality which act upon one another, which would be more difficult in adopting the dominant philosophical positions of positivism or interpretivism. If the observable components of PMM consist of structuring problems, attributing value, capturing data, communication, and analysis as presented in subsequent chapters, both the outcome of interest as well as the level differ widely even within the same management discipline. So, researchers may be interested in understanding the appropriateness of, say, one type of visualization technique over another, but this could include the need to understand technical aspects of design involving, say, database infrastructure, biological responses, the cultural setting, the organizational context, including past use of performance measures, the "fit" of the report and its measures vis-a-vis organizational strategy and process, leadership style, or feelings of procedural justice, just to name a few

(Franco-Santos *et al.*, 2012; Jääskeläinen and Roitto, 2016) So, PMM involves multiple levels and mechanisms types, and also takes place in complex organizational contexts. Positivism has difficulty reconciling so many levels because to study one, it ultimately has to reduce the world to it (Bhaskar, 1975). Critical realism, on the other hand, requires no such reduction, though it may of course, in practice, come across epistemological challenges. An additional objective of this thesis is to bring those challenges out, several of which are enumerated in Chapter 4.

Second, critical realism adds to the study of PMM by providing the basis for a rigorous and powerful approach to scientific discovery. This begins by describing or resolving PMM into its necessary components—a major theme in each of the following chapters—and then attempting to understand how these operate in a multi-layered reality described above. So the components of a PMM "system[2]" needs to be established, but also its components, and the other systems to which these may belong, and the larger entities at play (*e.g.*, capitalism). In this thesis, knowledge building takes the form of *RRREIC* and *DREIC*. Though the extent to which these allowed for correction in the thesis is debatable and will be discussed in the concluding chapter, the potential for these two approaches, and especially for their potential to reconcile retroductive, retrodictive, abductive, inductive, and deductive logics is exciting not just for PMM but also for management studies in general.

Therefore, the broad aim of this thesis is to consider the adoption of critical realism within the study of PMM.

**Research Question:** What are the implications for adopting a critical realist approach to studying performance measurement and management?

The following section considers the objectives of this thesis in more

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[2]Chapter 4 describes a system as a set of human activities; see (Mingers, 2014) for an overview of systems thinking within critical realism.

detail.

## 1.3 Objectives

Table 1.1 presents the primary and secondary objectives of the thesis. Although empirical work was carried out and is described in the following chapters, the thesis is centered on the *methodological* consequences of such an adoption, and in particular the identification of generative mechanisms and related processes. This was seen as the most urgent need to address in PMM, rather than a critique of a particular theory, although each chapter also addresses questions related to PMM theory. Specifically, the study of PMM is approached from a critical realist perspective, first, to offer a description of PMM and to describe the need for such a project. Next, a consideration for how generative mechanisms may be presented from the literature is presented. Finally, the consequences for adopting a critical realist approach in applied research is explored in relation to PMM.

**Table 1.1:** Objectives of the thesis

| Objective | Chapter |
|---|---|
| **Primary** <br> O1: Present the state of the art of performance measurement and management and the need for a critical realist approach and discuss the implications of such an approach <br><br> **Secondary** <br> O1.1 Discuss implications of approaching PMM from a critical realist stance <br> O1.2 Illustrate such an approach | 2 |
| **Primary** <br> O2: Consider a process for identifying mechanisms through realist literature review with PMM <br><br><br> **Secondary** <br> O2.1 Address how, for whom, and in what circumstances strategy maps work for performance measurement and management | 3 |

Continued on next page

**Table 1.1 Continued from previous page**

| Objective | Chapter |
|---|---|
| **Primary** | |
| O3: Develop a critical realist methodology for identifying PMM mechanisms for transformative practice, *i.e.* action research | 4 |
| **Secondary** | |
| O3.1 Elaborate a critical realist approach to soft systems methodology | |
| O3.2 Employ an illustrative case to discuss implications of the approach | |
| Source: The author | |
| | End of table |

The following section describes the contents of each of the chapters and their contributions to the study of PMM and research methodology.

Chapter 2 presents the immediate implications of adopting a critical realist stance to studying PMM, focusing on the concepts of the realist ontology—generative mechanisms, stratification, and levels—judgmental rationality, and epistemological relativity and especially how these concepts can be used to address a pressing issue of knowledge building within the discipline. The primary objective for Chapter 2, in relation to this thesis, is to explore the state of the art of PMM, and to present the need for exploring philosophical issues within the field. It focuses on the issues of empiricism, especially around the consequences of reducing ontology to experience. Specifically, it is argued that critical realism is especially well suited for PMM. This argument is made by exploring the concept of stratification, arguing that to develop strong explanations in PMM, researchers need to understand multiple levels of explanation. It is further argued that traditional empiricist approaches artificially reduce these levels, which has hindered progress to knowledge creation. To overcome this barrier, the chapter explores the *RRREIC* approach to discovery as first discussed by Bhaskar (1993). A case study is used to illustrate the concepts.

The dissemination strategy for Chapter 2, which represents the first

contribution of this thesis, can be found in Table 1.2.

**Table 1.2:** Dissemination strategy for first contribution: Chapter 2

| | |
|---|---|
| Title: | **Critical realism and performance measurement and management: Addressing challenges for knowledge creation** |
| Methodology: | Conceptual paper |
| Objective: | Discuss the implications of approaching PMM from a critical realist stance<br>Illustrate such an approach |

| Publication Strategy: | **1) Peer-Reviewed Publication** | |
|---|---|---|
| | Journal Name | Management Research Review |
| | Area | Business, Management and Accounting (Misc.) |
| | Impact Factor (SJR 2017) | 0.396 (Q2) |
| | Status | In Review (third round) |
| | **2) Conference Presentation** | |
| | Conference Name | British Academy of Management 2017 |
| | Location | Warwick, UK |
| | Date | September 4-7, 2017 |
| | Status | Presented |
| | | Winner: Best Developmental Paper Award - Performance Management track |
| | **3) Participation in Workshops** | |
| | Workshop Name | 10th EurOMA Workshop on journal publishing in Operations Management |
| | Location | Sant Cugat, Spain |
| | Date | November 27-28, 2017 |
| | Status | Presented |

Source: The author

End of table

Chapter 2 makes an argument for a critical realist approach and presents stratification and *RRREIC* as a means of addressing current

limitations to PMM study. A central implicit argument that critical realism makes as a part of the *RRREIC* approach is that knowledge about generative mechanisms, structures, and entities can be effectively synthesized through *retrodiction*. Retrodiction here refers to the process in research of explaining a particular situation with an existing theory of mechanisms (Wynn and Williams, 2012). Therefore, a major argument for critical realism is that, unlike strong interpretivist stances, it is possible to develop and apply a theory of enduring mechanisms in the first place!

One of the most essential ways of developing theories and building knowledge has been the literature review (Denyer and Tranfield, 2009). These reviews were traditionally narrative, and, many claimed, subjective (Tranfield *et al.*, 2003). Therefore, much effort has been dedicated to creating a more systematic means of gathering, analyzing, and synthesizing research. In evidence-based medicine, this has given rise to a hierarchy of evidence, ranging from randomized control trials and meta-analysis at the top to opinion or case studies at the bottom (Burns *et al.*, 2011). However, the argument for such a hierarchy rests on an empiricist approach, which stands on the idea that causal laws can be established inductively by observing events in succession.

Critical realism rejects the empiricist approach to systematic review on two grounds. First, it reduces reality to the level of events. Second, it commits the epistemic fallacy by assuming that reality can be objectively accessed by the researcher through quantitative analysis. Therefore, it permits an uncritical view of knowledge production and synthesis, in contrast to how these processes actually take place (Kuhn, 1970). If these ideas are rejected, what is the alternative to knowledge synthesis that fits within a generative view of causality and a meaning-filtered view of reality?

Chapter 3 considers the issue of synthesis. Specifically, it explores a process for identifying generative mechanisms through literature review called realist synthesis (Pawson, 2006). Realist synthesis is a relatively new technique that has been widely used in other disciplines such as

public health (Wong *et al.*, 2013), and which has generated interest within management (Jones and Gatrell, 2014). As opposed to other forms of systematic review, realist synthesis stresses a less linear process of review with greater emphasis on flexibility, in combination with a (critical) realist approach to ontology. It emerged in response to what was seen as an overemphasis on hierarchies of evidence within public health, which were ill-suited to the complex, multi-faceted issues facing costly, complex social interventions.

In terms of the objective of the thesis, Chapter 3 identifies realist synthesis a potential means of synthesizing a typically large and often conflicting evidence-base in a way that appreciates complex, often conflicting accounts of PMM. How PMM works in what circumstances, and why is not an easy question to answer. Chapter 3 employs realist synthesis to uncover the mechanisms of the strategy map, a popular tool within PMM frameworks. This chapter aims to separate the theory from the tool, and in the process offers 12 propositions to guide research and practice. The publication strategy for Chapter is presented in Table 1.3.

**Table 1.3:** Dissemination strategy for second contribution: Chapter 3

| Title: | **Strategy mapping for performance management: A realist synthesis** | |
|---|---|---|
| Methodology: | Systematic Literature Review | |
| Objective: | Consider a process for identifying mechanisms through realist literature review with PMM | |
| Publication Strategy: | **1) Peer-Reviewed Publication** | |
| | Journal Name | International Journal of Productivity and Performance Measurement |
| | Area | Business, Management and Accounting (Misc.) |
| | Impact Factor (SJR 2017) | 0.578 (Q1) |
| | Status | Accepted |
| | **2) Workshop Participation** | |
| | Workshop Name | PhD in Business Workshop |

**Table 1.3 Continued from previous page**

| | |
|---|---|
| Location | Barcelona, Spain |
| Date | February 21, 2017 |
| Status | Presented |

Source: The author

Chapter 3 provides an example of how critical realism can be used to develop knowledge from the literature and offers a framework on which to build. However, the ultimate aim of critical realism is to improve practice (and the human condition) (Bhaskar, 2016). Therefore, though a literature review is fundamental in providing applicable knowledge, a full consideration of how critical realism could benefit the study of PMM would not be complete without further consideration of its applications in field work.

Chapter 4 presents this applied methodology for exploring mechanisms in field work. It explores a popular action research methodology, Soft Systems Methodology (Checkland and Scholes, 1990), which has traditionally been approached from a phenomenological position. As discussed in Chapter 4, this position has been cited as problematic, in part due to aspects related to its position of judgmental relativity and the methodological consequences thereof (Mingers and Standing, 2017). As an action research project (Baskerville and Wood-Harper, 1998), the research involved in elaborating this chapter served a dual purpose: working with participants to improve practice and building knowledge for management theory. Soft systems provided an ideal vehicle for research for a number of reasons. First, it provides a framework for intervention which was easy for participants to understand, and so facilitated communications in the field. Second, soft systems is an established methodology with a long tradition of producing rigorous research, and the steps have been discussed previously as compatible with or convertible to a critical realist approach (Mingers, 2000a).

To address these, the implications of adopting a critical realist are considered, and in particular those of following the basic stages RRREIC

of *resolution, redescription, retroduction, elimination, identification, and correction* along with the realist ontology. A methodology informed by the critical realist approach was elaborated and applied in a non-profit association in Barcelona, Spain, in redesigning their PMM system. Importantly, adopting such an approach required a number of steps which are described in detail. This is an important contribution, as despite calls for incorporating critical realism and soft systems (Mingers, 2000b), specific examples had been lacking, and also involves the quite powerful combination of retroduction, retrodiction, elimination, and identification.

The dissemination strategy for Chapter 4 is presented in Table 1.4.

**Table 1.4:** Dissemination strategy for third contribution: Chapter 4

| | |
|---|---|
| Title: | **Elaborating a critical realist approach to soft systems methodology** |
| Methodology: | Action Research |
| Objective: | Develop a critical realist methodology for identifying mechanisms for transformative practice |
| Publication Strategy: | **1) Peer-Reviewed Publication** |

| | |
|---|---|
| Journal Name | Systemic Practice and Action Research |
| Area | Strategy and Management |
| Impact Factor (SJR) | 0.333 (Q2) |
| Impact Factor (JCR) | 0.797 (Q4) |
| Status | Accepted |

**2) Conference Presentation**

| | |
|---|---|
| Conference Name | European Academy of Management, 2018 |
| Location | Reykjavik, Iceland |
| Date | June 19-22, 2018 |
| Status | Presented |

Source: The author

End of table

15

## 1.4 Conclusions

This is an appropriate time to undertake such a study. The context in which PMM is used is changing (Bititci *et al.*, 2012), and there is a need to develop practically and theoretically adequate theories of PMM that work in this new environment. What once "worked" is now problematic: not only is there change to the environment in which organizations operate, but PMM faces issues of relevance and rigor (Andersen *et al.*, 2014). Addressing underlying philosophical issues is one means of advancing knowledge building in PMM, and this thesis sets out to explore one means to achieve that aim through critical realism, by re-envisioning PMM and understanding how, for whom, and in what circumstances it can be used to navigate organizations and organizing in an evolving context.

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# Chapter 2

# Critical realism and performance measurement and management: Addressing challenges for knowledge creation

**Abstract**

**Purpose:**
The aim of this paper is to explore the implications of adopting a critical realist position for the study of performance measurement and management (PMM) systems.

**Methods:**
This paper discusses recent challenges to knowledge creation in PMM, arguing that overcoming these will require revisiting often implicit philo-

sophical assumptions related to how the world is and how we learn about it. A critical realist perspective is explored and illustrated with the case of a software company attempting to empower and motivate its team.

**Findings:**

Critical realism provides a means of building interdisciplinary knowledge in PMM. In addition to a generative view of causality, critical realism could augment a systems view of PMM by adopting a stratified view of reality and through its applied approach to knowledge building. The case illustrates the RRREIC approach and highlights the interplay of mechanisms of different scales, and how this requires interdisciplinarity.

**Originality / Value:**

This paper adds to discussion of philosophical topics in management and PMM and could help resolve ongoing challenges to knowledge building in the field, especially around barriers to conducting interdisciplinary research. In combination with rigorous methods, a strong philosophical base can facilitate relevant, lasting theories that can respond to a changing organizational context.

## 2.1 Introduction

Performance measurement and management (PMM) is one of the fundamental tools of organizing, potentially facilitating learning or control and leading to improved organizational performance (Altin *et al.*, 2018; Bititci *et al.*, 2018; Franco-Santos *et al.*, 2012). However, researchers have noted difficulties with its ability to explain individual and organizational successes and failures (Choong, 2014a), to meet the challenges of the current organizational context (Bititci *et al.*, 2012), and to reach a consensus of what PMM consists (Franco-Santos *et al.*, 2007; Marr and Schiuma, 2003; Micheli and Mari, 2014).

Underlying these challenges are two related issues: complexity and disciplinarity. PMM is complex in the sense that it is made up of a potentially infinite number of elements that interact to produce outcomes

(Ashby, 1956, p.39). Understanding how PMM works requires not just social and technical factors, but also how these interrelate and interact in environments which are constantly in flux (Bititci *et al.*, 2012). Attempts at developing best practices with universal means to achieve performance through PMM have largely failed (Schleicher *et al.*, 2018). Developing theories that can successfully inform interventions with a more nuanced response, however, requires confronting how the myriad of components interact to produce outcomes (Okwir *et al.*, 2018).

At the heart of this challenge is the need to reconcile multiple views in a field that draws on several disciplines (Franco-Santos and Otley, 2018). The difficulties in building integrated knowledge in PMM also stem in part from a tendency for each discipline to remain isolated or "silo"(Marr and Schiuma, 2003), and stymies progress towards better understanding how and when such practices lead to improved performance by hindering theoretical integration and theory-informed interventions (Siedlok and Hibbert, 2014). This comes at a time when the context in which PMM operates is changing: economic, social, and technological factors are affecting how and why PMM is used (Bititci *et al.*, 2012). The issue, then, is that PMM research needs to find a way to cogently respond to complexity while building relevant knowledge that can inform interventions in a changing environment.

This is a pressing problem because PMM needs interdisciplinary studies to address its complex problems. PMM has been noted as having a significant relevance issue for practice (Andersen *et al.*, 2014; Mingers, 2015). This paper argues that addressing these issues requires revisiting underlying philosophical assumptions that inform PMM theory development. As will be argued, traditional, empiricist approaches are insufficient on their own to address complexity because they are inevitably forced to reduce it. As an alternative, this paper adopts a critical realist approach to PMM.

As a philosophical position, critical realism addresses issues related to what reality is like and how it can be known. Researchers of many disciplines, including management, have increasingly adopted a critical

realist position when conducting research (McGhee and Grant, 2017). Critical realism has appealed to researchers from a wide range of disciplines because of its commitment to a realist ontology, its appreciation of complexity, its recognition of meaningful activity, and its compatibility with multiple methodologies (Wynn and Williams, 2012). Specifically, it will be argued that a critical realist approach could provide an appropriate platform from which to develop relevant, interdisciplinary approaches to PMM and its inherent complexity by adopting a stratified view of reality. Next, critical realism has described a particular approach for learning about a stratified reality. This approach will be considered, as it could be especially appropriate both for maintaining relevance as well as building knowledge within PMM.

Therefore, this paper addresses two questions in order to consider PMM from a critical realist perspective:

- **RQ1:** What are the implications of adopting a critical realist approach for creating knowledge of PMM?

- **RQ2:** How can a critical realist approach contribute to research about PMM?

The paper is structured as follows: First, the basic concepts of critical realism are explored as they relate to PMM. This is followed by a consideration of a critical realist approach for studying how these may be employed to bring about positive individual and organizational outcomes. Finally, an illustrative case study demonstrates an application of a critical realist approach.

## 2.2   Background

This section will present an overview of conceptual difficulties within the study of PMM as a backdrop for a critical realist-inspired interpretation.

### 2.2.1 Knowledge building challenges in performance measurement and management

There has been a great amount of interest for PMM, understood here broadly as the choices around the quantification of the efficiency and effectiveness of organizational performance in order to improve it, and the related processes of data capture and information provision (Franco-Santos *et al.*, 2007; Neely *et al.*, 1995). PMM has the potential to positively impact organizational performance, but faces challenges around theory development and relevance as a discipline. These will be discussed below, specifically as they relate to the need to integrate levels and to address underlying philosophical issues.

First, PMM faces challenges for knowledge building, which are driven largely by its inherent complexity (Bourne *et al.*, 2018; Okwir *et al.*, 2018). PMM has been presented as adaptive social systems (Okwir *et al.*, 2018) which operate in situations which differ from organization to organization. This environment resists the development of "best practices", because it is characterized by limitless openness: what drives the success of one effort in one context may differ in another (Chenhall, 2003). Establishing causality given these conditions with a mind to inform practice is problematic (Bhaskar, 1975).

However, PMM faces an additional challenge in addressing this complexity because it is traditionally divided along disciplinary lines. PMM research has three dominant focuses: an interest in evaluating and improving individual performance, and the theories around it, a focus on the technical aspects of measurement, which seeks to understand or develop valid or novel measures of performance, and an organizational view, which is interested in systems of performance measurement and measurement practice (Ferreira and Otley, 2009). These perspectives draw on a wide range of management and organizational disciplines, primarily operations management, accounting, and human resources (Franco-Santos *et al.*, 2007; Tweedie *et al.*, 2018), but also information systems (Choong, 2013), public administration (Bürkland and Zachariassen, 2014; Pollitt, 2018), business in society (Wood and Garnett,

2010), and strategy (Adler, 2011; Henri, 2006).

Each of these perspectives center on different aspects of PMM, but may not specify which aspect of performance is of concern. For example, when examining research stemming from a human resources background, Schleicher *et al.* (2018) note that only 25% of reviewed papers stated the purpose of PMM within the organization. This is a worrying statistic considering that even studies within the same discipline quantify outcome variables in quite different ways (Franco-Santos *et al.*, 2012).

As a means of addressing the issue of purpose and complexity, researchers have increasingly adopted a systems perspective of PMM (Bourne *et al.*, 2018; Choong, 2013; Okwir *et al.*, 2018; Schleicher *et al.*, 2018). Broadly, a system is taken to be two or more components that interact to produce outcomes, with a boundary, in which each component is also a system. The advantage of this perspective is that it requires defining purpose while maintaining the importance of system components. At the same time, it potentially recognizes synergistic effects where the whole is greater than its parts, though how this synergy is meant to come about is sometimes vague (Choong, 2014b).

However, as will be argued in the following section, a systems approach alone will not resolve the barriers to knowledge building in PMM. First, disagreements exist around what is meant by the word "system" in general, and especially in situations where the various elements: inputs, transformation process, and outputs, are subject to human interpretation (Atkinson and Checkland, 1988). Next, PMM appears to have adopted a primarily "hard" systems view (Choong, 2014b) which adopts several aspects of General Systems Theory (Von Bertalanffy, 1968) but in which the desired outcome does not require interpretation. Most crucially for the current discussion, this hard take on systems has been challenged because in social situations, the problem itself is generally problematic (Checkland, 1983).

The issue goes to the heart of PMM, which has traditionally centered on an unproblematic quantification of efficiency and effectiveness. Re-

search recognizing the social nature of measurement and management is gaining prominence, but it is still the minority (Beer and Micheli, 2018). Further, despite this recognition, there are continued calls for considering technical and social aspects separately, whereas in practice this line is hard to draw (Beer and Micheli, 2018; Bürkland and Zachariassen, 2014; Dechow, 2012).

One potential way forward, and a major component of ongoing disagreement, is to address a lack of sufficient consideration of underlying philosophical assumptions. Specifically, the vast majority of PMM research takes a positivist approach which relies on a model of causality that requires artificially reducing complexity (Micheli and Mari, 2014; Miller and Tsang, 2010). As will be argued in the following section, this approach to causality is incompatible with the nuanced take on PMM, and ultimately requires an artificial flattening of levels, making a truly integrated study of PMM impossible.

### 2.2.2 Addressing complexity and integration with critical realism

To account for complexity and open systems, critical realism begins by separating ontology, the study of being, from epistemology, the nature of knowledge. In other words, it separates questions of *what is* from questions of *how we (humans) know*. As will be discussed, these perhaps seemingly trivial positions have profound implications for research and practice. Many of these as they apply to management have been discussed extensively (Mingers, 2000b; Wynn and Williams, 2012), and so the following paragraphs will concentrate on how critical realism can address the need for dealing with multiple levels and of developing PMM theory.

First, critical realism differs from a positivist or empiricist perspective of causality, which relies on seeking "constant conjunctions" of events. Under this perspective, reality is reduced to what can be experienced, and the goal of science centers on developing law-like statements about reality (Bhaskar, 1975). This is a major barrier to achieving interdisciplinarity because it essentially relies on a flat ontology: whether two

events (no matter their scale) are temporally related, rather than on explaining why they may be related. In practical terms, such a position implies asking "What works?", rather than "What works, for whom, in what circumstances, and why?" (Pawson, 2013).

In contrast to constant conjunctions of events, critical realism presents a "depth ontology", which consists of experienced events (the empirical), events which could be experienced (the actual), and the real or "deep" (Fleetwood, 2014). This "deep" consists of intransitive entities (physical, social, and cognitive), which have the power to generate observable events through the operation of mechanisms. In this way, critical realism distinguishes the observable event from the mechanism which generated it, but also knowledge about the mechanism from the mechanism itself (Smith and Johnston, 2014). This is the first way by which critical realism avoids flattening reality to one level.

In rejecting a view of causality as constant conjunctions of events, critical realism adopts a generative model around mechanisms and structures (Mingers and Standing, 2017). This approach sees events as occurring (or not) as the result of the interaction of these mechanisms, often acting simultaneously and at multiple, stratified levels. Astbury and Leeuw (2010) note that they are 1) generally not directly observable (at least at the level of interest) 2) sensitive to context and 3) generate observable outcomes. Social mechanisms are constrained by preexisting, intransitive structures which, if social, may be reproduced or transformed by human agents (Archer, 1995). These combinations have been referred to as "CMO" or "CSMO" configurations (Bhaskar, 2014; Pawson, 2006), for Context, Mechanism, Structure, and Outcome. So, critical realist-inspired studies emphasize the role of context, seeking to understand the circumstances in which certain generative mechanisms will act to generate outcomes.

To further avoid reducing reality to observable events, critical realism relies on the concept of emergence to elaborate a second level of stratification in addition to distinguishing real, actual, and empirical (Bhaskar and Danermark, 2006). Like systems theory, critical realism

sees higher-order levels as made up of interrelating components at a lower level, but which have emergent properties which are both taxonomically and causally irreducible to these (Bhaskar, 2010; Mingers, 2014). This conception also includes other systems concepts such as boundary, where defining a system in terms of its components and their relationships is effectively to delineate its boundary (Mingers, 2011). However, a systems perspective, especially of the hard variety, may inadvertently reduce reality to one level if it attempts to establish causality through observation of possibly unrelated events operating at different levels, especially when these involve social entities.

Smith (2011, p. 38) refers to the potential for flattening as trying to answer the question "What is this?" with "What is this made of?", which can be extended to answering "What is this capable of?" From the causal mechanisms perspective, through emergence organizations are capable of things individuals are not (else, why form them?), and likewise an overly controlling PMM system could be described as oppressive (Sewell *et al.*, 2012), but understanding an oppressive system through individual measures or particular practices would tell an incomplete story. So on the one hand, entities of a lower order cannot explain the behavior of the whole—Archer (1995) refers to this as upward conflation. On the other hand, a higher order entity cannot be used on its own to explain the behavior of a lower one, as would be the case of explaining individual behavior based solely upon the systems within which they operate.

To avoid flattening and maintain a layered perspective of reality, Bhaskar and Danermark (2006) have employed the concept of scale. However, the current discussion is most interested in stratification based on scale as it relates to social being. Here, scale refers to the relative ordering of mechanisms according to their level. For example, Bhaskar and Danermark (2006) use seven: physical, biological, psychological, psychosocial, socio-economic, sociocultural, and normative to analyze disability research. These levels are meant to be case specific—in studying violence against women, for example, Price (2014) observes traumatic childhood experiences, lack of opportunity, oppressive face-to-face in-

29

teractions, patriarchal culture, inequalities in society, colonialism, and global patterns of inequality.

Because entities are made up of interacting components at different levels, but whose behavior cannot be understood by understanding these components alone, there is both a need to explore the mechanisms of each (multidisciplinarity), as well as how these interact (interdisciplinarity). What critical realism stresses is that although arguments can be made for the importance of a particular level (disciplinarity), no one would be sufficient for a complete understanding of the problem (Bhaskar, 2016). Therefore, critical realism has the potential to avoid artificially flattening ontology and allowing for an interdisciplinary study of PMM.

### 2.2.3   A critical realist approach to knowledge building

Critical realism has developed a particular method to respond to open, complex systems, and it will be argued that this can facilitate disciplinary integration and also the issue of relevance. This discussion centers on the critical realist approach to applied research, consisting of resolution of complex phenomena into components, redescription in an explanatory way, retroduction of hypothetical explanatory mechanisms or retrodiction of antecedent causal events, elimination of alternative competing explanations, identification of the acting mechanisms, and finally correction of existing theories (*RRREIC*) (Bhaskar, 2010) (Table 2.1). As will be argued below, the combination of abductive redescription, retroduction and retrodiction, and epistemological relativism is seen as particularly advantageous for PMM.

**Table 2.1:** The RRREIC model of theoretical enquiry

| Stage | Description | Guiding Question(s): | Notes |
|---|---|---|---|
| Resolution | Identifying the physical, social, or cognitive components and events to be explained | What happened? What are the key events to be explained? | "The first step of RRREIC, resolution into component parts, is based on awareness that causes in open systems are multifaceted and differing disciplines and fields have expertise in various causes." (Robert Isaksen, 2016) <br> "First, the event is resolved into its component parts that may have had some causal effect on the outcome. This essentially describes the boundaries and key aspects or components of the situation." (Wynn and Williams, 2012) |
| Redescription | Elaborating a number of possible explanations for an event, including interpretitive frameworks, ideas, theories, or hunches | How can I undestand the relevant physical, social, and human entities? How do these relate to a larger context? What interpretive frameworks could help me understand what is happening? | 1. Several different theories about how the entities relate can be presented, compared, and possibly integrated. Danermark *et al.* (2002) refer to this process as "abductive redescription" (pp. 110). <br> 2. Abduction is taken here to mean "an ampliative and conjectural mode of inquiry through which we engender and entertain hunches, explanatory propositions, ideas, and theoretical elements" (Locke *et al.*, 2008) |

**Table 2.1 Continued from previous page**

| Stage | Description | Guiding Question(s): | Notes |
|---|---|---|---|
| Retrodiction or Retroduction | Retroduction: Elaborating a mechanism or model that, if it existed, would account for the phenomenon of interest<br><br>Retrodiction: Understanding how powers and mechanisms interact in a given context | What mechanism would explain the experienced events, if it existed? (retroduction)<br><br>What combination of mechanisms could have produced the event(s) of interest? (retrodiction) | 1. Elder-vass (2007) highlights the need for retrodiction: "if we want to understand particular events, we need to understand much more than one particular causal power; we need to understand all of the causal powers that are interacting to product the event, and how they affect each other"<br>2. The difference between the two lies in identifying one mechanism (retroduction) versus explaining how a particular mechanism (in systems terms, an interrelation between two components) occurs in a situation with multiple mechanisms (retroduction). See discussion in Modell (2017)<br>3. Bhaskar (2016, pp. 81) notes that these processes will occur simultaneously to some degree because in the social sciences we cannot effectively isolate mechanisms to begin with: "Hence we have the theorem of the contingent duality (and simultaneity) of discovery and application, together with that of the (again contingent) co-incidence of retroductive and retrodictive moments in research" (emphasis in original) |

**Table 2.1 Continued from previous page**

| Stage | Description | Guiding Question(s): | Notes |
|---|---|---|---|
| Elimination | Eliminating explanations of the above | Which of the possible explanations is improbable? | 1. The guiding criterial for elimination is explanatory power (Collier, 1994, p. 164) |
| | | | 2. Uses empirical evidence: "To the extent that for each determinate effect there is a plurality of possible causes retrodiction alone cannot be decisive. And so it will need to be supplemented by independent evidence for the antecedents until we have eliminated from the total set of possible causes all but the one which, together with the other factors at work, actually produced the effect on the occasion in question." (Bhaskar, 1975, p.115) |
| Identification | Identifying the remaining mechanism(s) that explain the event of interest | Which of the remaining explanations is most plausible? | Because critical realism sees human knowledge of reality as intrasitive, it is always revisable |

33

**Table 2.1 Continued from previous page**

| Stage | Description | Guiding Question(s): | Notes |
| --- | --- | --- | --- |
| Correction | "The iterative correction of earlier findings in the light of this identification" - Bhaskar, 2016, p. 30 | How do these findings impact what we know about the world? How should I communicate these findings for the betterment of practice? | In the natural sciences, correction may result in changes to how an entity or event is defined: "At this level, having discovered the possession of a free electron is what accounts for the fact that metal conduct electricity, the posession of a free electron comes to be regarded as defining what it is to be a metal, so that anything that did not conduct electricity would not be metal at all" Bhaskar (2016, pp. 31). |

Source: The author

End of table

Resolution is the initial response to complexity and involves appreciating multiple causes, mechanisms, and theories that could explain the situation of interest, including a consideration of it in its context (Bhaskar, 2010). The key levels of explanation begin to emerge during this stage, though there is no *a priori* conception of the levels of interest in developing a particular explanation. Next, redescription goes a step further by deepening the analysis and centering on "causally relevant facts", often by incorporating existing theoretical lenses (Bhaskar, 2010; Rotaru *et al.*, 2014).

Retroduction involves developing a mechanism that could explain the empirical events to be explained (Mingers, 2004). Retrodiction, on the other hand, seeks to move from the components of interest to their interrelations and causes. That is, retrodiction seeks to understand antecedent states of affairs and the mechanisms that drive them via existing theories, and observing these in the conditions under study (Mcavoy and Butler, 2018). Since under open systems this implies understanding the mechanism(s) at play, explaining events generally involves a combination of retrodictive and retroductive processes. This combination of retroductive and retrodictive processes enables a creative process of study (Bhaskar, 2016, p.81) which allows complex phenomena to be better understood in unique contexts.

Once plausible mechanisms have been proposed, then research moves to eliminating less plausible explanations and inferring to the best possible one through empirical corroboration (Wynn and Williams, 2012). Critical realism is epistemologically relative, meaning that the methods used can vary according to the needs of the study (see O'Mahoney and Vincent, 2014, for a discussion). It is also fallible, because our knowledge of reality will always be separate from reality itself. Because of this separation, any subsequent identification and correction of theory is tentative. However, this does not hold that all findings will be equally valid or equally wrong, but rather that some explanations will better approximate reality (Zachariadis *et al.*, 2013).

## 2.3 Illustrative Case

To illustrate a critical realist approach to studying PMM systems, a case in which a performance dashboard was developed to empower workers and address on-going issues during a time of transition. The case focuses on HireTech, a small company in Western USA which develops software for recruitment and selection.

### 2.3.1 Study context and methods

The study was participatory, in that the researcher assumed an active role in developing the performance measurement and management system, attending meetings and developing major portions of the reporting infrastructure and the reports themselves. Data were also collected through semi-structured interviews, observation of meetings, informal conversations, archival data, and company communications. The focus of this study is this period of significant strategic change in 2016, with follow-up interviews in 2017 and early 2018.

The case is ideal for illustrating the approach, not only because it allowed the process of change to be observed, but also because it required actively confronting issues of level and boundaries, which were aided by the parameters set by circumstances. In the study the research participated as an external consultant and the primary focus was on the PMM, yet the case demanded attention to other areas, which could be incorporated into PMM practices.

The project described here formed a part of an ongoing program to build an empowered team, understood here as a sense of meaning, competence (clarity in goal and process), self-determination, and impact. The study followed the RRREIC described previously steps in a cyclical fashion, beginning with a broader view of the situation at the organization in general, and then focusing on a particular element of interest (Table 2). This case describes one such instance around the development of a performance dashboard and its relation to the PMM system. These cycles will be described to illustrate the approach to consider the distinct levels involved.

**Table 2.2:** RRREIC approach for empowerment project

| RRREIC Stage | Methods and Collection | Cycle 1: PMM System | Cycle 2: Component focus | Cycle 3: Re-Expansion to System |
|---|---|---|---|---|
| Resolution: Exploring Events | Interview, Observation, Archival Evidence | Initial problem statement followed by interviews, observation, use of archival data to break situation into its components | Problem redefined in light of ongoing interviews and survey results | Re-resolution: Additional events from ongoing observations incorporated |
| Redescription | Thematic Coding, Literature Synthesis | Enumeration and incorporation of PMM theories using Ferreira and Otley (2009) to organize in relation to problematic situation | Enumeration and incorporation of PMM theories centering on feedback (Iglen and Barnes-Farrell, 1993) in relation to problematic situation that could be addressed by a new performance dashboard | Incorporation of new PMM theories in light of previous findings |
| Retrodiction and retroduction | | | | |

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**Table 2.2 Continued from previous page**

| RRREIC Stage | Methods and Collection | Cycle 1: PMM System | Cycle 2: Component focus | Cycle 3: Re-Expansion to System |
|---|---|---|---|---|
| Elimination | Survey, observation, and seeking "practical adequacy" | Broad categories eliminated via survey & interview (e.g. issues of goal clarity and information availability) | Empirical corroboration through interview and observation: positive v. negative feedback and reported increased use | |
| Identification | | Focus on measurement properties and data availability: deciding on dashboard component to focus on | Mechanism theory (Figure 2) developed to inform corrective action | |
| Correction | | Corrective action: Preparation of Cycle 2 | Dashboard completion and revisiting of initial problem statement | Action plan for next PMM component |

Source: The author

End of table

38

### 2.3.2 Cycle 1: Understanding the performance measurement and management system

The purpose of Cycle 1 was to begin to *resolve* an essentially limitless amount of complexity, keeping in mind the interest of the project and the interests of the case organization as communicated by the CEO, in this case a focus on empowerment. Resolution involved observations from participating in meetings, interviews, emails, and other archival data sources such as the company web page.

Here the open nature of social systems is evident in a potentially limitless number of related events. For example, not only had the founder recently returned as CEO, the company had changed headquarters, and strategy was likewise evolving, moving to a new pricing model and targeting a new market segment. Other aspects that arose in interviews and through observations were shifting objectives for the software development team, investor doubts, an office switch requiring new commutes for many, high turn-over rates, and several new initiatives related to the evolving strategy. The interest of the project, then, was to make sense of these events in some way to assist in creating an inspired, motivated team with initiative and understanding of the goals of the organization: an empowered team.

To *redescribe* these events in a theoretically meaningful way, the boundary for what was considered the PMM system was drawn from the literature, specifically Ferreira and Otley (2009), who consider a PMM to include vision, key success factors, organizational structure, strategy, measures, target setting, evaluation, rewards, information systems, change, the means of use, coherence of the system, culture, and contextual factors. Such a broad conception of PMM effectively delineated the boundary of the system of interest without being overly restrictive.

Adopting an existing framework helped to order events and to distinguish the system of interest from others. For example, a system of data capture had been designed not only to communicate information for the sake of empowerment, but also (and indeed primarily) to improve the

product, and to facilitate communication with outside stakeholders for the purpose of gaining funding.

A process of *retrodiction* and *retroduction* followed in order to develop a list of possible explanations for the now ordered events. These processes consisted of maintaining a sort of "diagnosis table", based on existing literature reviews around PMM systems (*e.g.* Van Camp and Braet, 2016) and the knowledge of the author. Where no explanation could be found in PMM literature, possible explanations were *retroduced* and subsequently sought in general organizational and management literature.

**Figure 2.1:** The system within organizational strategy

Local / National Market
Conditions

**Organizational Strategy**

**PMM System**

Pro-social mission

Participative design

Fair, achievable targets

Goal and role
clarity

**Dashboard Component**

High availability of
strategic measures

Measures on strategic
focus

Team empowerment

Transparency in
communication

Trust in leadership

−

Open, timely discussion
of performance

Fear of repercussions

−

Information proliferation

−

Defensiveness

National unemployment

Figure 1 shows the system meant to measure and manage performance, and its relationship to organizational strategy. The entities and relations shown in Figure 1 are result of *elimination and identification*, where solid black lines indicate mechanisms that were identified as acting and critical in achieving the goal of empowerment. Dotted black lines indicate relations which were seen as important but not hindering the achievement of an empowered team at the time of the study. So a participative design involving the whole team to identify measures was meant to increase focus on the essential, thereby decreasing information proliferation, which lowers strategic focus. Entities with the PMM system—the availability of these measures, along with timely, open discussion of feedback—would decrease fear of negative repercussions and defensiveness and increase understanding of goals and roles. Combined with a pro-social mission (in this case, getting people jobs), these elements would lead to empowerment: a motivated team capable and willing of taking the appropriate action to achieve organizational goals.

Note that the relationship between any two of these would require a deeper, separate consideration of mechanism. For example, a great deal has been written on the links between fear and defensive behavior (*e.g.* Argyris, 2010). However, for the purposes of understanding the relationship between the PMM system and empowerment at the systems level, the mechanisms connecting openness, fear, and defensiveness had to be largely ignored. Likewise the PMM system acts upon and is constrained the organization (the grey arrows in Figure 1), itself acting within a local, national, and global environment.

Finally, developing an explanatory framework found in Figure 1 involved the *elimination* of several mechanisms found in PMM literature and discussed at the case organization. For example, an incomplete set of measures can lead some groups to see the PMM system as unfair or coercive (Wouters and Wilderom, 2008), and therefore a potential barrier to empowerment. However, a team survey, interviews, and informal discussions revealed that staff felt the measurement set was complete

and therefore not contributing to a lack of empowerment.

Based on the findings at this stage and as a means of increasing the availability of strategic measures and participation, the project moved to redesigning an existing performance dashboard.

### 2.3.3  Cycle 2: The Dashboard Component

The decision to focus on the performance dashboard required a reconsideration of events, as analysis now centered on technical and psychological components and their interactions. This refocusing was necessary because some elements important to understanding the PMM system were more or less so when designing the dashboard. For example, how the dashboard related to other PMM system components such as targets and reward structures was important in understanding outcomes of the system, but could do less to inform the dashboard design.

So, this stage of the project considered elements related to technological and physical infrastructure, and how these could be best leveraged to contribute to the goal of empowerment. For example, a sophisticated and existing information infrastructure allowed much data to be readily accessible. Database reporting software could then be used to display this information in real time on a monitor placed at the entrance of the company's main office. These observations and others formed the basis of a new stage of *resolution* around the performance dashboard.

However, developing a new performance dashboard as a component of the PMM system used to communicate performance information, also required seeking a suitable means of *redescribing* how the elements might relate. Again, an existing theoretical framework was adapted to order how feedback information is interpreted by the individual (Ilgen *et al.*, 1979) and how these relate to motivation, understanding, and ultimately empowerment (Grant, 2008; Hall, 2008). These were not the only existing theoretical frameworks on the technical or psychological aspects of PMM, but rather were selected in light of the aims of the project.

In the case of the dashboard, the main form of reasoning used was

*retrodiction*, in that, at the level of interest, existing theory seemed to provide a practically adequate means of understanding and taking action. However, the acting mechanisms were again subjected to a process of *elimination and identification*, largely through seeking practically adequate indications through interviews and throughout its development.

For example, during development various visual elements were used to positively frame performance. At one point, these were met with suspicion ("What's with these stars!?", one employee exclaimed in response to one update). The visual properties were then modified based on feedback until a suitable solution was implemented.

**Figure 2.2:** The Dashboard component of the performance measurement and management system
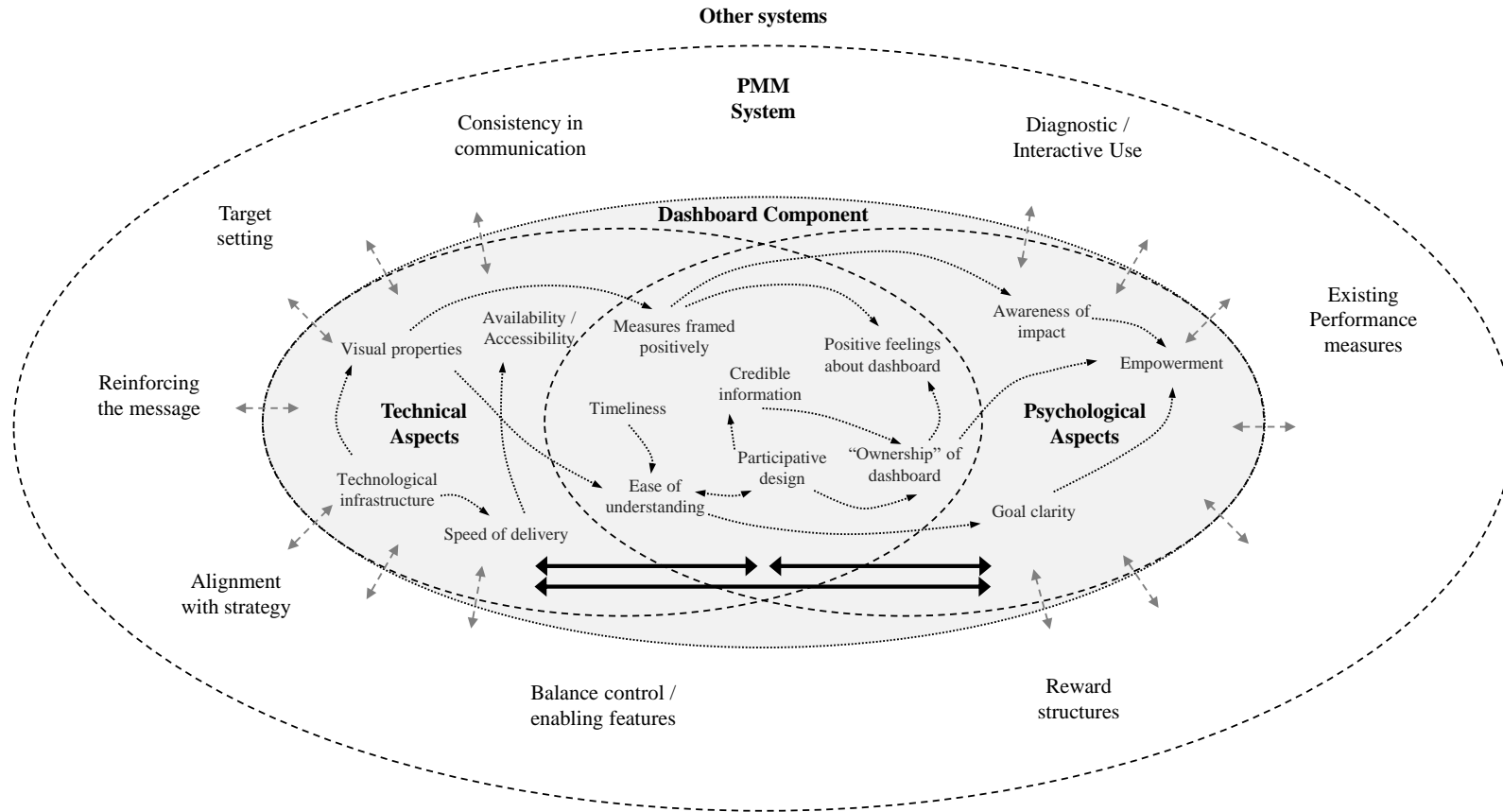
Figure 2 presents the program theory that informed the dashboard project. This shows the technical aspects, along with a participative design, facilitating understanding and credibility, and ultimately a sense of ownership of the dashboard itself. Together, ownership and a positive framing could influence team members' awareness of their positive impact and the goals of the organization, leading to individual empowerment.

### 2.3.4 Cycle 3: Revisiting the whole and subsequent

As a component of a wider PMM system, the impact of the new performance dashboard was expected to be limited. Therefore, to achieve the ultimate goal of empowerment it was necessary to move again from a focused perspective on psychological and technical aspects relating to the dashboard back to the wider system and its relation to the organization. Here, new events needed to be *resolved* and persisting challenges reconsidered. These required new theories to explain outcomes, or, in their absence, a new process of retroduction, followed by elimination, identification, and subsequent corrective action.

### 2.4 Discussion and Conclusions

This paper discusses a critical realist approach as a means of addressing complexity and for gaining relevance within PMM studies. As such, it forms a part of a growing but still limited literature on the implications of critical realism for research practice. Specifically, it is argued here that critical realism can help PMM address issues by facilitating interdisciplinary knowledge building.

First, it is argued that a critical realist approach could ensure the development of relevant knowledge. The present discussion centers on the *RRREIC* approach, which provides a means of approaching complex phenomena acting in open systems by first resolving the events involved, and then redescribing them in a meaningful way. However, what this paper means to illustrate is that the combination of retroduction, retroduction, and elimination is especially powerful for building knowledge.

In the case that a theoretical framework is used, it requires fitting it (or not) to the complex and unique situation of study that could explain how certain components relate. But then, if no such theory is practically adequate, it allows a process of retroduction to develop potentially new explanations that could explain the outcome of interest, at which point they can be evaluated and corroborated through empirical evidence, or eliminated as unlikely or implausible. Therefore, such an approach actively and deliberately pushes the boundaries of current knowledge by constantly subjecting current knowledge to scrutiny. Bhaskar (2016) refers to this idea as the principle of hermeticism: that in addition to research contexts, existing theories and explanations should be tested in every day life.

Such an approach also has several limitations and these were evident in the illustrative study. First, there was a clear trade-off in the field between activities related to understanding mechanisms and achieving a practically adequate solution. In the case of the performance dashboard development especially, evaluative activities were limited due to the resources available and the scope of the project.

These limitations, which are likely to arise in field work (Suomala *et al.*, 2014), draw attention to the importance of developing collaborative research approaches to support deeper explorations of mechanisms that can extend beyond a particular case. The case study relied on indicators of practical adequacy and therefore the extent to which results could be generalized is limited. Here, researchers have cautioned against adopting the critical realist position that all knowledge is corrigible as an excuse for lack of rigor (Contu and Willmott, 2005). Indeed, the results of this case study would need to be further corroborated in other contexts in order to validate them (Smith and Johnston, 2014).

Second, critical realism could address barriers to knowledge building in PMM due to a tendency towards disciplinarity by adopting an emergent, stratified view of reality. In the case study, opportunities for interdisciplinary study were made clear by including the concept of scale. For example, connecting the system components in Figure

2 would require a consideration of mechanisms at a deeper level. For example, underlying biological processes of the around perception (*e.g.* Cleveland and Mcgill, 1985) can be used to understand how visual displays are read and interpreted, but in the case study were treated as a system component and subsumed under the item "Visual properties" (See Figure 2). On the other end of the spectrum during Cycle 1, both organizational and societal factors, *e.g.* attitudes about the role of measurement in general, could have helped explain the context and contributed to a more complete explanation. Both of these potentially interesting levels needed to be temporarily abstracted to allow for action within the scope of the study. This concentration on fewer levels was intentional to allow for the creation of a practical intervention and is typical when project scope is small (Mingers, 2014, p.144). Future studies could further consider scale in PMM systems to develop more complete explanations.

This deliberate treatment of level in the study of PMM could benefit practice because it demands appreciation of complexity that gives fair treatment to the big picture as well as the small. In the case study, what seemed to be a limitation for the dashboard was actually helping to create an atmosphere of empowerment, because the organizing effort around its apparent limitations helped create an atmosphere of openness and of mutual support. In this way, critical realism can help avoid artificially and unknowingly reducing complexity, which ultimately can lead to incomplete explanations and inadequate solutions.

In pursuing interdisciplinarity, there is an opportunity to merge current discussions of systems thinking in PMM with critical realism. It is argued here that systems thinking alone is not enough to address complexity because it does not necessarily address how components of the system relate. Therefore, future discussion could develop these themes and their relations, as it has been argued elsewhere that both approaches stand to benefit from integration (Mingers, 2014).

In addition to the limitations above, it should be noted that in adopting a critical realist approach, researchers should be aware of both

development of themes and ongoing debate amongst critical realists and realists (Richards, 2018), and also other alternatives to positivism. The merits and implications of these are outside the scope of this discussion, but in adopting a critical realist position, researchers would be entering this debate. Additionally, as a relatively new position, guidance on how to proceed with the processes of elimination and identification is just beginning to emerge (Robert Isaksen, 2016).

Critical realism facilitates the kinds of interdisciplinary approaches that are required to tackle complex problems (Siedlok and Hibbert, 2014). This focus is seen as especially timely, as PMM is operating in a rapidly changing organizational context with new technologies, new forms of organizing, and changing values (Bititci *et al.*, 2012; Stolz, 2016). Therefore, this paper has potential societal implications because it presents one means through which PMM can remain relevant given these changing conditions. At the same time, practitioners stand to benefit the most from the adoption of a critical realist approach, because ultimately the artificial flattening of levels impedes the ability to develop practically adequate solutions. Therefore, the approach provides a potential means of bridging the research–practice gap.

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# Chapter 3

# Strategy mapping for performance management: A realist synthesis

**Abstract**

**Purpose:** The purpose of this paper is to extract and evaluate how strategy maps work within a performance management framework.

**Design/methodology/approach:** The study employs realist synthesis, a method of systematic literature review. A theory on how strategy maps work is extracted from performance management literature, which are subsequently evaluated through a critical examination of empirical studies.

**Findings:** A theory of the mechanisms producing strategy maps outcomes were evaluated using 52 empirical studies from multiple sources. Strategy maps may facilitate the performance management stages of problem structuring, development, and use through their effectiveness

as external representations or by stimulating social interactions. Based on findings, 12 propositions are offered related to the effective use of strategy maps within a performance management framework.

**Research limitations/implications:** Strategy mapping has great potential to facilitate performance management processes, but the potential has yet to be realized. By extracting the generative mechanisms that explain how they work and in what circumstances, this study presents several directions and neglected uses of strategy maps in the changing context.

**Practical Implications:** This study can be of value to practitioners who use or are interesting in using strategy maps, particularly for structuring problems and defining performance measures.

**Originality/value:** Distinguishing the aims and mechanisms of the strategy map along performance management systems has the potential to greatly increase their effectiveness in practice as a powerful, but underutilized tool. This paper also demonstrates how realist synthesis, currently an uncommon method in management studies, facilitated the creation of a new perspective of strategy maps to fit specifically within performance management.

## 3.1 Introduction

The strategy map entered discussions of performance management as a central component of the Balanced Scorecard framework (Kaplan and Norton, 1996), one of the most widely used performance management frameworks (Rigby and Bilodeau, 2015). The strategy map is meant

to convey ideas of causality between performance measures, and thus can communicate the story of an organization: how its intangible assets lead to competitive advantage and performance. Strategy maps can aid in formulating strategy and structuring problems, in defining specific measures and objectives, and in decision making (Hodgkinson and Clarkson, 2005; Kaplan and Norton, 2004, 2006; Lueg and Julner, 2014).

Despite their potential, the use of strategy mas has been limited. Researchers have noted that few organizations employ strategy maps at all, either for strategic control or strategy formulation (Laitinen *et al.*, 2010; Speckbacher *et al.*, 2003; Tapinos *et al.*, 2010). Why then, has their supposed potential been limited?

Researchers have identified a few challenges. First, descriptions of the role of strategy maps and how they are meant to work within the Balanced Scorecard framework have remained vague, often do not specify the outcome intended through their use, or apply overly generalized conceptions of performance (Hoque, 2014; Lueg, 2015; Öllinger *et al.*, 2015). This lack of specificity is important for two reasons. First, researchers have questioned its suitability for evaluation purposes, the focus of a large amount of research attention (Lueg, 2015; Malina *et al.*, 2007). Second, research outside of performance management on causal mapping highlights its complexity (Hodgkinson and Clarkson, 2005), and so combined with its light treatment in performance management and lack of reported adoption in practice merits further attention.

Therefore, the aim of this paper is to make the purpose and theories of how strategy maps are meant to work explicit. There are two intended contributions through this aim: First, specifying purpose and extracting theory can help practitioners better fit them to purpose and allow maps to be employed more effectively. This synthesis addresses this aim specifically by offering several propositions inferred from the review results. Second, it aims to permit performance management research and practice to be able to adapt, adjust, and expand existing and emerging theory on maps and mapping beyond that offered in the original Bal-

anced Scorecard framework. In other words, instead of whether strategy maps "work", the interest of this study is to develop an understanding of the generative mechanisms behind strategy maps:

**RQ:** How and in what circumstances do strategy maps contribute to increased organizational performance?

The objective of this paper is to address the research question through a realist synthesis (Pawson, 2006) of empirical studies on the use of strategy maps as a part of a performance management framework. A realist synthesis is a type of systematic literature review that focuses on developing a theory of how a particular tool, framework, program, or intervention is meant to work, and then examines the evidence to evaluate the strength of the theory. Because it focuses on theory rather than the tool itself, it is well-suited for evaluating complex interventions like the use of strategy maps, in which there may be multiple, conflicting factors influencing its outcomes. The idea is that by separating the theory from the tool, realist synthesis can facilitate knowledge creation and make it easier to adapt its use to a particular context.

The paper proceeds as follows: First, it explores realist synthesis and the methods of review. Next, results are presented, then discussed along with implications for research and practitioners.

## 3.2 Methodology

This article describes a realist synthesis (Pawson, 2006). In practical terms, the method begins with a guiding question: "What works for whom under what circumstances, how, and why?" (Wong *et al.*, 2013). Underlying this question is a realist philosophy of science, which will be briefly discussed in the following paragraphs as a backdrop to the synthesis method.

### 3.2.1 Why realism?

Scientific realism developed largely in response to a criticism that traditional research approaches were limited in their ability to provide explanations because they relied on artificially creating or assuming closed experimental conditions (Sayer, 1992). In most cases, experimental closure is undesirable or impossible, because reality is fundamentally open (Bhaskar, 1975). This openness quickly comes into conflict with the more commonly employed Humean view of causality which seeks to establish scientific laws by seeking events in succession (Hume, 1967).

Under this empiricist approach, reality is seen as obeying universal laws which can be uncovered through the repeated observation of events. Researchers can then *induce* the existence of these laws, which can then be tested via statistical methods to establish their validity.

However, scientific practice under the empiricist approach has been criticized because it effectively reduces reality to observable events. In social systems, this position has been cited as especially problematic because it allows for the meaningfulness of social interactions to be completely ignored or greatly reduced (Bhaskar, 1979).

As an alternative, realism adopts a generative view of causality under which cognitive, social, and physical entities interrelate to produce events via mechanisms. The primary aim of science under this perspective is to identify these mechanisms and understand their nature in order to improve practice (Bhaskar, 2014). However, disagreements exist on the meaning of the term which have complicated its application in practice (Dalkin *et al.*, 2015), and so some further clarification is needed.

First, mechanisms are described as the generally unobservable relations between processes, physical and social structures, and ideas that produce outcomes (Astbury and Leeuw, 2010; Mingers and Standing, 2017), which may operate in different contexts in which other mechanisms may be operating simultaneously. Because of the focus on how mechanisms operate in particular contexts to produce outcomes, realist evaluation often reports results in a "CMO" configuration for *context,*

*mechanism, outcome* (Pawson, 2013). However, several researchers have pointed out continued confusion on what constitutes a mechanism and what does not (Craver, 2009; Dalkin *et al.*, 2015; Mingers and Standing, 2017). This discussion adopts the view of (Mingers, 2014), in which the mechanism explains the relation between the entities within a system that gives rise to the outcome of interest.

Before illustrating the concept of mechanism used here, it is important to note that from the realist perspective, mechanisms operate in a stratified reality (Astbury and Leeuw, 2010; Bhaskar and Danermark, 2006). There are a number of ways in which realists conceive of stratification (Bhaskar, 2010), but what is important here is the concept of emergence, *i.e.* that the properties of an entity cannot be reduced to any one of its components, but rather emerge from their interaction.

An example using a matchstick can help illustrate these concepts. At one level, the combination of its chemical composition and the friction of the surface creates a process of combustion which, given the right conditions (*e.g.* the presence of oxygen), will produce a flame. Chemical composition and combustion is the mechanism that explains the outcome of the flame but provide part, but not all of the explanation. For example, to achieve the generation of the flame matches generally cannot be lit under water. Neither will the flame be produced if the wrong technique is used: Too much pressure, and the matchstick breaks. Too little, and there will not be enough friction for the reaction to take place.

This type of analysis is open to higher-order considerations such as why the match might be struck in the first place, or the systems of production and infrastructure that could explain its existence. It also includes an interest in secondary outcomes: Light a match on an airplane, for example, and the interrelation of various social structures will likely result in the person's arrest—an emergent outcome which cannot be explained through the match's chemical properties alone and requires understanding how people make sense of the action.

### 3.2.2 Why realist synthesis?

Adopting a realist approach to discovery has several implications for how research is carried out and, importantly, how evidence is cumulated and synthesized. Critically, rejecting a view of causality based on events implies that traditional forms of systematic literature review (Tranfield *et al.*, 2003) require revisiting.

Systematic literature review originated in the field of medicine as means of consolidating existing knowledge. These reviews were meant to increase rigor over traditional, narrative reviews through transparency, inclusivity, and a focus on explanation (Denyer and Tranfield, 2009). Realist synthesis adopts many of the elements of these reviews, but requires adapting explanations into the generative view, adopting a more flexible approach to evidence gathering and to collection, and by abandoning the traditional hierarchy of evidence in evaluation. These elements and their implications will be discussed below corresponding with the stages of review, but essentially, realist syntheses involve two processes: extracting the theories of how a particular intervention works (the mechanisms) via abductive redescription or abstraction, and evaluating the strength of those theories through a critical examination of the studies uncovered through the search processes.

The following section describes the stages and methods of review, which following Pawson (2006) include identifying a topic, extracting theory, search for literature, selection and appraisal, extraction, analysis, and synthesis.

### 3.2.3 Identifying the topic of review

Strategy maps are often discussed within performance measurement and management research as a part of the Balanced Scorecard framework. Here, the scoping study revealed generally vague descriptions of how the strategy maps were meant to work, corroborating observations of much literature on the Balanced Scorecard in general (Hoque, 2014). Therefore, it was thought that a focus on strategy maps would have the greatest potential impact for practitioners and also would benefit

performance measurement theory-building.

### 3.2.4 Extracting the theory of strategy maps within a performance management framework

In a realist synthesis, how an intervention is meant to work often needs to be interpreted or adapted to fit the realist ontology. Even if some research implicitly uses a generative model of causality, few are described initially in such a way (Wynn and Williams, 2012). Others may be useful for evaluating the effectiveness of maps but focus on outcomes whose primary interest is not the direct improvement of organizational performance, *e.g.* for conflict resolution (Ackermann *et al.*, 2016).

Therefore, a scoping study served to develop an initial classification of potential mechanisms using the foundational texts of the Balanced Scorecard (Kaplan and Norton, 2001, 2004, 2006, *e.g.*), practitioner resources on the topic (Balanced Scorecard Institute, 2017), and reviews on casual maps and strategy maps (Hodgkinson and Clarkson, 2005; Lueg and Julner, 2014). Theories resulting from the scoping study were refined as the study progressed through a process of abstraction or abductive redescription—in other words, describing how the maps were meant to work in uniform terms to fit performance management.

These were grouped according to their associated performance measurement stage, whether to structure problems, develop, implement, or modify a performance management system, or for use as an analysis or communication tool. During the search process, the background section of each study included in the full-text review was evaluated to extract the theory, if present, of how the strategy map or mapping process was meant to work.

The mechanism theory, presented in Section 3, was further divided into hierarchies depending on level, such that the lowest involved largely psychological processes, and the highest considered organizational outcomes. This process and its implications will be explored in the discussion section, but centered on examining how maps could affect organizational properties via the actions of many individuals and their emergent

properties (Astbury and Leeuw, 2010).

### 3.2.5 Search Processes

Figure 1 shows an outline of the process for the synthesis. The search for studies to evaluate the propositions began with keyword searches for "performance measurement" in the academic citation databases of Scopus and Web of Knowledge, and later expanded to include "causal map" and "strategy map". The searches were intentionally broad to increase the likelihood of including relevant articles in the review. That search began with keyword searches of the Scopus and Web of Knowledge academic databases, resulting in 6583 unique articles. Additional text filters resulted in 4225 articles for title and abstract review. The review relied heavily on the snowball approach, following Denyer *et al.* (2008), where references of each selected article were searched for relevant evidence.

### 3.2.6 Selection and Appraisal of Evidence

For the purposes of this review, the definition of performance measurement came from Franco-Santos *et al.* (2007), who argue that a performance measurement system exists if there are processes of measure design and selection, data capture, and information provision, features performance measures and supporting infrastructure, and has the role of measuring performance. This definition was selected because it encompasses only the necessary conditions of a performance measurement system, and would allow for a wide range of texts to be included.

Selection criteria:

- Addresses performance measurement or management in organizations

- Describes an empirical study

- Explores the consequences of the use of strategy or causal maps for either structuring problems, developing performance measures,

**Figure 3.1:** Search Processes
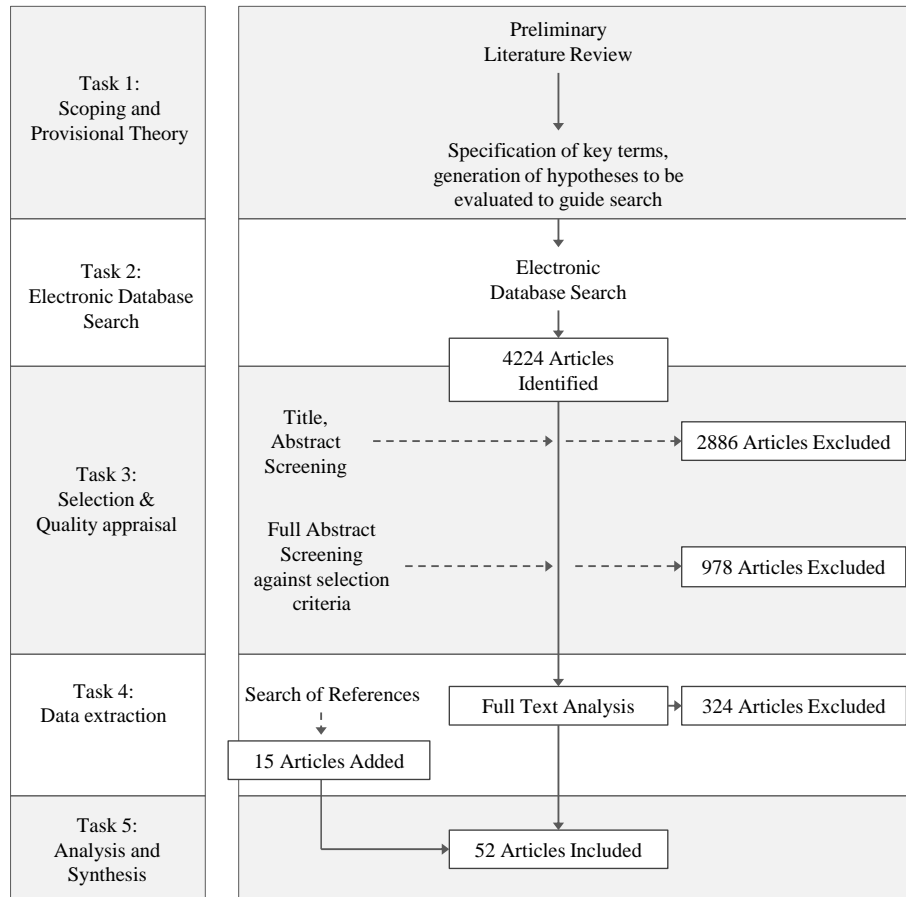


communicating performance, or analyzing performance

- Journal is included in the Scopus Citations Index or Journal Citations Report

- Article is published between 1992 and 2017

- Results in English

Selection criteria was applied in stages. Titles and abstracts were reviewed separately to exclude only those articles that did not meet the selection criteria. Articles with the possibility of relevance were passed on for further review, and were considered relevant if they could

be used to evaluate the developing program theory. Articles that met all the inclusion criteria that were published in peer-reviewed journals were included, though not all impacted the final synthesis to an equal extent. For example, though the study by Cugini *et al.* (2011) on the application of strategy maps in a university setting provided an example of a successful implementation, the study mainly focuses on describing the resulting strategically linked scorecard, offering little evidence for evaluating underlying causal mechanisms.

Application of the selection criteria resulted in 52 studies which were included in the final review.

### 3.2.7 Extraction

An extraction form was used to categorize the proposed mechanisms, the context, subject, intervention characteristics, and an assessment of relevance and rigor of each of the studies. The logical mode for this process is referred to as abstraction by Pawson (2006) and abductive redescription by Bhaskar (2016), *i.e.* describing events in a theoretically significant way. As it became clear which factors were of particular interest, the extraction form was refined to include the new information, and studies which had been previously examined were examined again to consider any new information. This reflects a recognition that database protocols may need more flexibility in studies on organizations than in the context of evidence-based medicine (Tranfield *et al.*, 2003).

### 3.2.8 Analysis and Synthesis Process

Unlike traditional systematic review, the process of analysis and synthesis takes place along side assessing relevance and extracting data. Following Pawson (2006) and Wong *et al.* (2013), full texts were reviewed and analyzed, and specific, relevant findings were matched to their corresponding proposition. The synthesis comes from comparing and contrasting findings from the included studies to infer a likely explanation. While a full description of the process is beyond the scope of this paper, it is important to note that first, the same study may support

one proposition while not another. The synthesis process attempts to understand these to provide insight on why this might be so. The use of specific findings and not studies as a whole also implies that studies may inform the evaluation of more than one proposition. In this way, the findings of these studies were used to evaluate the propositions that were derived in the process of abstraction.

## 3.3  A theory of maps for performance management

Performance management refers to a wide range of processes which center on setting goals, defining performance measures, reviewing and acting upon performance data, and the activities that surround these, with the ultimate goal to improve organizational performance (Bititci *et al.*, 2018). Strategy maps have been implicated in any number of these activities, but broadly, their use can be seen as addressing three separate but interrelated performance management stages or processes. These stages can be to structure problems, generally in the form of *strategy formation*, to select, define, modify, or develop an existing performance management component or system, or to communicate, analyze, or evaluate performance, here referred to as *use*. It should be noted that studies within performance management rarely distinguish between these different purposes, which, as will be discussed, has complicated research into strategy maps.

The following section explores how maps are seen to drive the desired positive outcomes of each stage. This theory is the result of abstraction described in the previous section, and its purpose is to provide a high-level framework that facilitates the evaluation of results. Alluding again to the match example where combustion provides a baseline explanation for how a match generates a flame, this section aims to find a baseline explanation as to how a strategy map would generate its outcomes.

A summary of the articles included in this review can be found in the Appendix which includes the citation, the methodological approach, propositions addressed, research context, the type of strategy map, its complexity, elicitation technique, and, if appropriate, the method of its

development.

### 3.3.1   Strategy Mapping for Problem Structuring

Strategy maps within performance management were originally presented as a way of "describing strategy" *in order to* understand it (Kaplan and Norton, 2001). This statement highlights that mapping for structuring problems is an active process which aims to facilitate the generation of ideas, gaining a broader understanding, and ultimately pursuing a more effective strategy. Within management studies, mapping has been used to achieve a wide range of ends. Of interest to this review are the mechanisms that explain how the creation of maps work for strategy formation and execution for an individual, in groups, and finally how these can lead to the pursuit of a more effective strategy and increased organizational performance.

**The outcome: What is a structured problem?**

Broadly, when exploring outcomes for individuals these studies are concerned with gaining a deeper understanding of an issue. Understanding is discussed as task performance (Öllinger *et al.*, 2015), new knowledge or ideas (Goodier *et al.*, 2010), presenting a diverse range of concepts (Goodier and Soetanto, 2013), or complexity of maps presented (Xu, 2011).

There is also an interest in how participants perceive the strategy or strategy making process, which is often pursued in tandem. For example, mapping can be used for changing how people feel about the strategy itself, whether by allowing their views to be heard, by separating the ideas from the speaker, and from the motivational effects these can generate (Ackermann and Eden, 2011). Because of the potential, mapping is used for consensus building and conflict resolution (Ackermann and Eden, 2005; Ackermann *et al.*, 2016, 2014). Ultimately, within performance management the outcomes discussed above are meant to facilitate the pursuit of a more appropriate or effective strategy (Goodier *et al.*, 2010; Jenkins and Johnson, 1997). A full list of outcomes for structuring found

in this review is included in Table 1.

## How are maps meant to help structure problems?

Figure 1 presents the mechanisms that were found in the literature that would explain how strategy maps can generate learning, motivation, ownership, and, ultimately, the pursuit of a more effective strategy—the outcomes sought through their use as a tool for structuring problems. These outcomes correspond to three levels that have been abstracted from the literature: a psychological level whose outcomes are understanding and motivation, a group or social level where, in addition to reaching a shared, broader understanding, there can positive changes in attitude, and finally, the generation and selection of an appropriate course of action at the organizational level.

**Figure 3.2:** Mechanisms and conditioning structures of maps for structuring problems
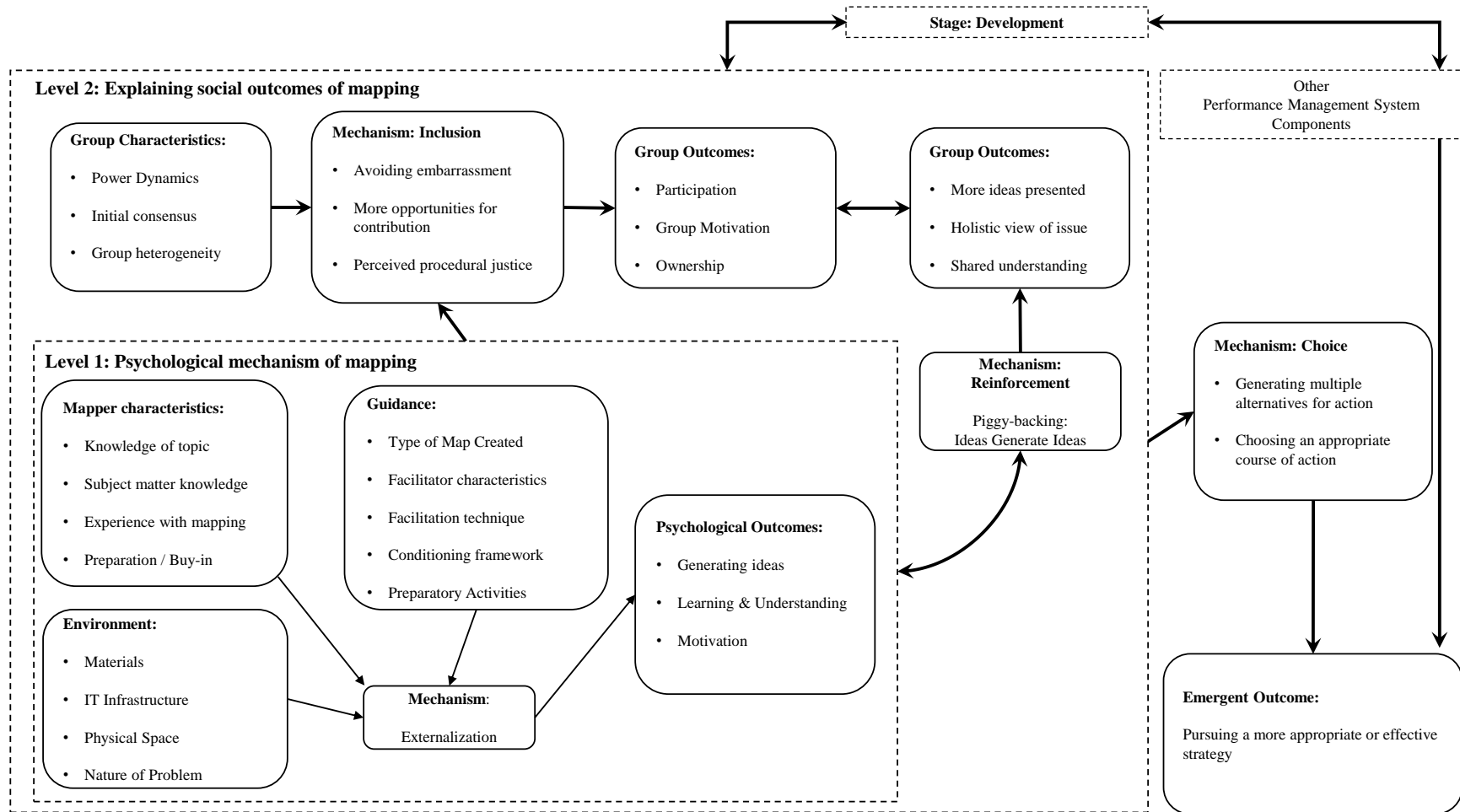
For the individual, maps are meant to lead to understanding by functioning as a kind of mirror, a process referred to here as *externalization*. By creating a map, the mapper makes ideas about an issue explicit, and thereby can see and reflect upon it. The nature of the knowledge created and how externalization works has been debated extensively (see Hodgkinson and Clarkson (2005) for an overview) but remain outside the scope of this paper. What is important is that the node–link structure of causal maps specifically is a key component because it allows seeing, reflecting upon, and possibly modifying how ideas relate to one another (Eden, 1988).

Groups can achieve consensus or shared understanding, more holistic views of an issue, and have more ideas presented in several ways. First, through the externalization process, participants are able to avoid embarrassment and "save face" (Eden, 2004), participate more, and also perceive the process as fair. As a result, participation, motivation, and ownership of the strategy formation process increases. This mechanism is referred to here as *inclusion*. Second, the visual mapping process allows participants to "piggy back" (Shaw *et al.*, 2009) off one another's ideas, and so the process has a self-referential effect. This mechanism is referred to here as *reinforcement*.

The ideas generated through mapping provide multiple alternatives for action beyond those of other techniques, and so allow decision makers to choose a more appropriate course of action through the increased understanding gained through mapping. This mechanism is referred to here as *choice*.

Figure 1 also includes a number of components which condition whether and the extent to which externalization will take place. These will be considered further when evaluating the evidence, but can be divided roughly into the characteristics of the mapper and their environment, including the nature of the problem. As will be discussed, In groups and for the organization these are especially important for explaining (lack of) outcomes.

### 3.3.2 Mapping for System Development

For the current discussion, "development" refers to processes that aim to alter the state of an existing performance measurement or management system, and is meant to include both implementation of a new system and adaptation of existing ones. Within performance management, there is clear interest in using maps for system development and in developing maps themselves (Bourne and Bourne, 2011; Kaplan and Norton, 2004).

**What outcomes are sought for development?**

Generally, the outcome sought during development is selecting or creating an "appropriate" measure, or more broadly, creating a more effective performance measurement system. The terms "appropriate" and "effective" are dependent on their context and take on different meanings in the studies in this review, but drew on performance management literature. For example, Lucianetti (2010) investigates the use of strategy maps for translating strategy into operational goals, for adopting new performance measures, and for making cause and effect relationships between measures explicit. Drawing on (Neely *et al.*, 1995), Montemari and Nielsen (2013) seek measures that are related to specific goals, controllable, have an explicit management purpose, reflect system causality, and provide vision. Studies also seek coherence, completeness, a balance of measures (Cugini *et al.*, 2011; Parisi, 2013), or consensus as to the appropriateness of the included measures (Aranda and Arellano, 2010; Francioli and Cinquini, 2014).

**How do maps help develop performance management systems?**

Development generally discussed either as an extension of the structuring process (Aranda and Arellano, 2010; Parisi, 2013). That is, mapping is meant to assist with the selection or measures or with the attribution of value. In effect, strategy maps help answer "what do we measure?" (Montemari and Nielsen, 2013), either by *externalizing* the idea, or by providing a sufficiently broad vision of the organization, thus increasing the likelihood that appropriate measures are *chosen* to be developed and

included, or that other performance management system components are adapted to align to strategy.

### 3.3.3 A theory of strategy maps for use

Within performance management, the potential for maps for communicating and effectively analysis of organizational strategy and performance has been widely discussed (Francioli and Cinquini, 2014; Kaplan, 2012; Nørreklit *et al.*, 2012). Rather than centering on the process of mapping, this discussion begins when a map has already been formed and codified. The typical form this takes within performance management is a hierarchical map, sometimes arranged into perspectives following the Balanced Scorecard, of a limited number of performance measures (Kaplan and Norton, 2004). The following sections will consider what these reports have been used to achieve, and how they are meant to achieve it.

**What outcomes are sought through use?**

Strategy maps have primarily been discussed within the context of diagnostic and interactive use (Simons, 1995). That is, there is an interest in evaluating the extent to which the organization has been effective or efficient in its pursuit of the strategy (diagnostic), but also in evaluating the extent to which the current strategy is appropriate (interactive). The interest within performance management centers around how maps can lead to better understanding and decision making, and ultimately to increased organizational performance. For an individual evaluating a map-style report, this review is concerned with how strategy maps effectively communicate performance *relative to* other types of communication.

Operationalized, the aim of using a strategy map for evaluation can be categorized broadly as enabling improved decision making for the individual, and for the organization consensus, collaboration, and double-loop learning (Argyris, 2010). A list of outcomes of interest included in this review is included in Table 3.

**Figure 3.3:** Mechanisms and conditioning structures of maps for use
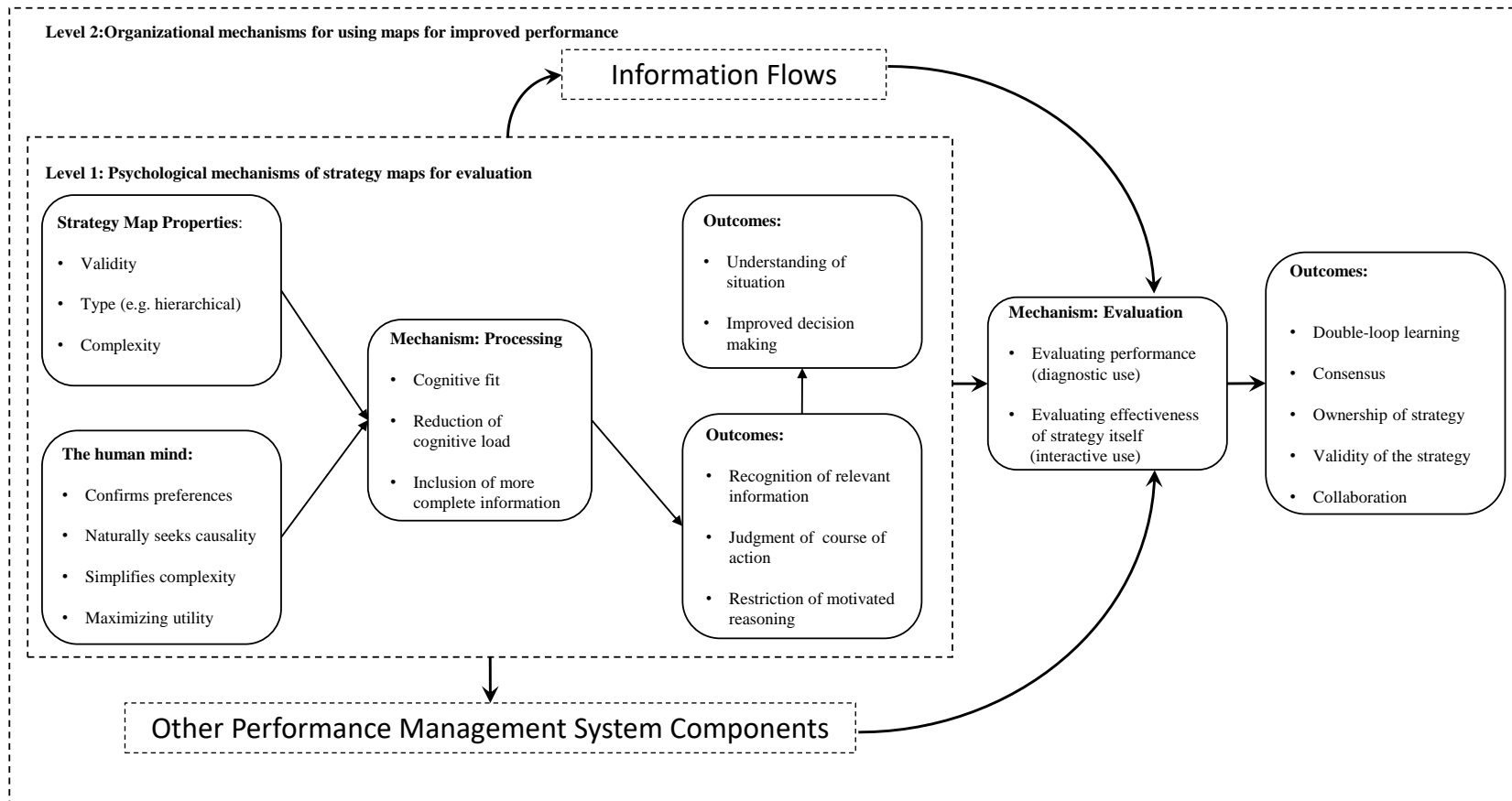
**How do maps work for use?**

How maps are meant to bring about the outcomes described above can be separated into mechanisms explaining improved decisions making at an individual level and the organizational level. For the individual, given the way the mind works, that the node–link structure is appropriate for use, helping to reduce cognitive load and at the same time allowing the inclusion of a more representative depiction of reality (Frederiksen *et al.*, 2011). This mechanism is referred to in Figure 2 as *processing*.

There is some discussion that suggests that communicating and analyzing strategy maps facilitates understanding and empowerment, which facilitate organizational learning, consensus, and strategic alignment (Kaplan and Norton, 2004, 2006). Because these discussions revolve around both evaluating the extent to which a given strategy has been achieved and also evaluating the appropriateness of the strategy itself, this mechanism is referred to here as *evaluation*.

## 3.4 Evaluating the evidence

The previous section has outlined how strategy maps are meant to work within a performance management context. However, in explaining how a match produces flame, what is also needed is to understand key conditioning components that would explain whether a given attempt will produce a flame or not. Therefore, the following section evaluates both the strength of the evidence for the mechanisms presented in the previous section, along with the critical conditions, elements, and components that determine whether or not the desired outcome is realized. Propositions are inferred from these observations in order to help researchers and practitioners better fit existing theory on strategy maps and mapping to the needs performance management.

### 3.4.1 The evidence: Strategy mapping for problem structuring

The previous section puts forth that the process of creating a strategy map works through externalization, inclusion, reinforcement, and by offering choice. The articles in Table 1 address strategy maps or mapping

for problem structuring, and these provide the evidence with which the mechanisms can be evaluated, along with observations of conditioning factors.

**Table 3.1:** Studies addressing Problem Structuring

| Source | Summary of Findings | Task Setting |
|---|---|---|
| Öllinger et al. 2015 | Causal mapping in structuration → improved decision making during subsequent task(NS), E | Individual |
| Montemari & Nielson, 2013 | Aiding in the process of creating a causal map → increased understanding of intangible assets (+), C | |
| González et al. 2012 | Described elicication using 'repertory grid technique' → goal clarity, understanding of organizational goals (+), C | |
| Aranda & Arellano, 2010 | Elicitating a causal map → Understanding of strategy (+), E | |
| Tegarden et al. 2010 | Anonymity during individual map creation → range of concepts presented, understanding of how to achieve goals(+), P | |
| Pinch et al. 2010 | Freehand mapping process → revealing issues about which mappers are not aware (NS) | |
| | Freehand mapping process → understanding of organizational and social context of design thinking (+), P | |
| Tegarden & Sheets, 2009 | Mapping with framing statements and anonymity → Ease of arriving at a shared vocabulary, understanding of strategy (+), C | |
| Kunc, 2008 | Application of Systems Thinking to develop strategy maps → Mental Model Accuracy (+), E | |
| Vo, 2005 | Involvement in mapping session → Subjective Assessment of the map for evaluation of performance (+)*, E | |
| Hodgkinson et al. 2004 | Pairwise elicitation technique for map creation → map complexity (+), perceived effort (NS) | |
| | Freehand elicitation technique for map creation → map complexity (+), perceived effort (NS), E | |
| Jenkins & Johnson, 1997 | Complexity of elicited map → firm performance (+), C | |

**Table 3.1 Continued from previous page**

| Source | Summary of Findings | Task Setting |
|---|---|---|
| Cossette & Audet, 1992 | Elicitation using indirect and direct tecniques → Learning outcomes of mapping (+), C | |
| Langfield-Smith, 1992 | Elicitation using separate questioning, card sorting, and feedback interviews → Success in creating map (+), P | |
| Ackermann & Alexander, 2016 | Use of mapping in conjunction with Group Support Software → Conflict Resolution (+), C | In Group |
| Ackermann et al. 2014 | Use of Mapping with Group Support System → understanding (+), holistic view of the problem (+), P | |
| Francioli & Cinquini, 2014 | Process of creating, reviewing, and discussing strategic linkages → successful development and use (+), C | |
| Parisi, 2013 | Using more than one elicitation technique for mapping → avoidance of confirmatory bias (+), elicitation of tacit knowledge, favorable development outcome(+), A | |
| Montemari & Nielson, 2013 | Aiding in the process of creating a causal map → actor's increased understanding of complex network (+), C | |
| Goodier & Soetanto, 2013 | Handdrawn Mapping followed by Group Support System software for map creation → Understanding of issues relevant to the mapping session (+), inclusion of viewpoints (+), P | |
| Gouttenoire et al. 2013 | Causal Mapping Process with Group Support System and effective facilitation → self-reflection, understanding of issues, and interest of participants (+), P | |
| González et al. 2012 | Individual mapping sessions followed by group comparison → Aligning managers' perceptions of organizational strategy (+), C | |

81

Table 3.1 Continued from previous page

**Table 3.1 Continued from previous page**

| Source | Summary of Findings | Task Setting |
|---|---|---|
| Cugini et al. 2011 | Collaborative approach to elicitation → successful development of a strategy map (+), E | |
| Van den Bossche et al. 2011 | Having a shared mental model → group task performance (+), E | |
| Xu, 2011 | Social interaction → resulting map complexity (+) | |
| | Feelings of psychological safety → resulting map complexity (+) | |
| | Moderating effect of gender (NS), E | |
| Aranda & Arellano, 2010 | Creating a Strategic Map as a group → Mutual Understanding within a management team (+), E | |
| Goodier et al. 2010 | Elicitation through future scenario building → Group Think during group mapping (-), engaging participants, understanding of relevant issues and implications of decisions, P | |
| Tegarden et al. 2010 | Previous individual, anonymous mapping session → bringing underlying issues to the surface (+), P | |
| Lucianetti, 2010 | Using a strategy map → Increasing participation of top management in strategy formation (+), S | |
| Shaw et al. 2009 | JOURNEY mapping process with anonymity → broader understanding, inclusion, and synthesis of ideas (+), P | |
| Niebecker et al. 2008 | Use of impact matrix for creation of strategy map → successful building of map (+)*, P | |
| Vo, 2005 | Aggregation technique for creating strategy maps → Map Complexity (+), E | |
| Ackermann & Eden, 2005 | Anonymous, software supported mapping process → defensiveness (-), learning (+), inclusion of ideas (+), P | |
| Craig & Moores, 2005 | Discusses special difficulties for family firms in initial structuring with strategy maps and uses a scale (F-PEC) to address this difficulty, C | |

**Table 3.1 Continued from previous page**

| Source | Summary of Findings | Task Setting |
|---|---|---|
| Shaw, 2004 | Software supported causal mapping creating and sharing new ideas (+), understanding of issues (+), P | |
| Cossette, 1992 | Elicitation using indirect and direct tecniques → Organizational performance through individual action (+), C | |
| Langfield-Smith, 1992 | Describes a mapping session in which participants were unable to create a shared map. Cites power dynamics, lack of shared experiences, and design in the mapping process as possible contributing factors, P | |

Notes: '+' signifies a positive relation; '-', a negative relation; '*': partially supported; NS: Non-significant results.
Methods: C: Case Study, P: Participatory Workshop(s), E: Experimental Design, S: Survey, A: Action Research

Source: The Author

End of table

First, it should be noted that research is supportive of the potential for mapping for learning purposes. Which conditions a successful use of strategy maps for structuring problems? The elements that condition successful outcomes—the firing of mechanisms, in realist synthesis terms—can be grouped into individual and group characteristics, environment, and guidance (also included in Figure 1).

**Participant Characteristics**

First, the characteristics of the person doing the mapping conditions the extent to which learning will occur. Öllinger *et al.* (2015) highlights that creating a map requires a deal of effort, which will be greater for those who lack experience. The properties of the resulting map also appears to be linked to role (Pinch *et al.*, 2010; Tegarden *et al.*, 2009), and industry (Pinch *et al.*, 2010).

**P1: Mapping will be less effective for learning for those with low subject-matter familiarity.**

When undertaken as a group, differences in age, experience, background, resulting in unbalanced power dynamics can significantly affect the mapping process (Goodier *et al.*, 2010; Gouttenoire *et al.*, 2013; Shaw, 2004; Vo *et al.*, 2005; Xu, 2011). Langfield-Smith (1992) cites a lack of shared vocabulary as contributing to a failed group mapping attempt among members of the same profession. Importantly, feelings of psychological safety encourage mappers to present ideas, which can be encouraged through the adoption of various techniques to support *inclusion* (Ackermann and Eden, 2005; Xu, 2011). Therefore it appears that the greater the group diversity, differences in power, culture, or language, the more difficult it will be to synthesize ideas. These complications are important because the *type* of social interaction produced in mapping sessions is critical, with evidence of constructive conflict and inclusion of ideas as being particularly important to achieving positive group outcomes (Ackermann *et al.*, 2014; Shaw *et al.*, 2009; Van

den Bossche *et al.*, 2011).

**P2: Diverse groups which view an issue in different ways will have more difficulty achieving consensus.**

However, several studies highlight the potential benefit of multiple possibly conflicting viewpoints (Goodier *et al.*, 2010; Gouttenoire *et al.*, 2013). Therefore, if diversity or opposing viewpoints do not result in exclusion of ideas, results can be beneficial.

**P3: Diverse groups which view an issue in different ways will produce richer, more complete representations.**

**Guidance**

It is well established that the process followed will condition successful outcomes (Ackermann *et al.*, 2016; Langfield-Smith, 1992). Despite detailed discussions of the importance of technique, only one study, that of Hodgkinson *et al.* (2004), compares two techniques directly and finds significantly greater complexity when possible combinations of ideas are presented together before they are linked. Other studies include a separate opportunity for generating ideas, either using cards or matrices (Langfield-Smith, 1992; Montemari and Nielsen, 2013), framing statements (Tegarden *et al.*, 2009), or previous interviews (Cossette, 1992). This suggests efforts to elicit ideas prior to linking them may indeed be beneficial, though research is lacking on the size and significance of comparing techniques. Finally, the questions used to elicit and link ideas are critical (Tegarden *et al.*, 2010). It should be noted that the positive learning outcomes, even at an individual level, were obtained in the presence of a highly trained researcher. A skilled facilitator with the proper technique may be capable of overcoming the barriers mentioned above, even with highly diverse, conflicting groups (Ackermann *et al.*, 2016, *e.g.*), by taking steps to encourage psychological safety, balance participation, and ask appropriate questions.

**P4: Guidance results in greater learning to the extent that it helps people to understand mapping, provides a structured, fair process, and provides an opportunity for fair participation.**

Further, to the extent that group outcomes are achieved through fairness and inclusion, any attempt that fails to address these in a session may not only fail to bring about consensus and group learning but may also make things worse. Langfield-Smith (1992) reports simply failing to reach consensus, but the *reinforcing* effect in groups and the efforts taken by researchers focusing on structuring in this review suggest the following:

**P5: In groups that lack initial consensus and without appropriate guidance, mapping will exacerbate existing disagreements.**

**Environment**

The first concern for performance management is understanding whether strategy mapping is more suitable to some problems over others. The diversity of contexts found in this review (See Appendix) suggests that the applications are wide ranging and include small and large organizations, for profit, non-profit, different levels of experience and career level, and inter-organizational contexts. This suggests that:

**P6: Mapping will be useful for structuring problems regardless of organizational context or career level.**

The most common means are by providing an opportunity for individuals to generate ideas prior to group mapping (Aranda and Arellano, 2010; Goodier and Soetanto, 2013; Goodier *et al.*, 2010). Prior elicitation also can improve learning outcomes by increasing the number of ideas presented in group sessions (Goodier and Soetanto, 2013). Software-assisted mapping, sometimes in combination with individual

idea generating sessions, is another means of facilitating anonymity, and can be used in real-time (Ackermann *et al.*, 2016; Goodier and Soetanto, 2013; Niebecker *et al.*, 2008; Shaw *et al.*, 2009; Vo *et al.*, 2005).

These studies highlight that the physical space in which mapping is critical to achieving positive outcomes. Here, software can be beneficial in that it allows maps to be more easily edited in real-time compared to other techniques (Ackermann *et al.*, 2016). However, other studies use physical materials and achieve similar outcomes (Goodier and Soetanto, 2013; Hodgkinson *et al.*, 2004).

**P7: Environmental conditions such as physical space or software assisted mapping will condition learning outcomes.**

Finally, the question as to whether and in what circumstance the positive outcomes of mapping translate into organizations pursuing a more appropriate strategy, a central idea for Kaplan and Norton (2004). Because no study considered this issue directly, this issue will be explored further in the discussions section.

### 3.4.2 Strategy maps for development

These paragraphs explore strategy maps for developing and implementing performance measures and performance measurement systems.

Studies contributing to the analysis of the role of strategy maps in development are listed in Table 2.

**Table 3.2:** Studies addressing development

| Source | Summary of Findings | Task Setting |
|---|---|---|
| Montemari & Nielson, 2013 | Development process using previously developed causal map → identification of appropriate measures (+), C | Individual |
| Tayler, 2010 | Involvement in measurement selection → motivated reasoning (+) | |
| | Involvement in measurement selection + evaluation with BSC-style strategy map → motivated reasoning (-) , E | |
| Francioli & Cinquini, 2014 | Development using informal strategy maps with finality relations between measures → avoiding tensions, costs associated with attempting to validate causal links, successful development and use of resulting Balanced Scorecard report (+), C | In Group |
| Parisi, 2013 | Use of hybrid map development technique and strategic map → selection of the most important, appropriate measures (+), A | |
| Montemari & Nielson, 2013 | Development process using previously developed causal map → identification and implementation of measures that are related to specific goals, controllable, have an explicit purpose, reflect system causality, and provide vision (+), C | |
| Cugini et al. 2011 | Collaborative approach to development → Developing a more accurate and complete strategy map (+), E | |
| Aranda & Arellano, 2010 | Communicating Strategic Links during development → Consensus between top and middle management, E | |
| Lucianetti, 2010 | Use of strategy map → | |
| | Translating strategy into operational goals (+) | |
| | Adopting new performance measures (+) | |
| | Explicating cause–effect relationships (+), S | |

**Table 3.2 Continued from previous page**

| Source | Summary of Findings | Task Setting |
|---|---|---|
| Niebecker et al. 2008 | Use of impact matrix → increased transparency across working groups, identifying relevant performance measures (+)*, P | |
| Craig & Moores, 2005 | Notes difficulty in development varies depending on its category (internal, customer, financial, or learning), C | |

Notes: '+' signifies a positive relationship; '-', a negative relationship; '*': partially supported; NS: Non-significant results. Methods: C: Case Study, P: Participatory Workshop(s), E: Experimental Design, S: Survey, A: Action Research

Source: The Author

End of table

When individuals develop performance measures by creating or helping to create maps, then mapping for development appears to be essentially an extension of problem structuring and works in a similar manner, with similar outcomes. That is, mapping draws attention to the most appropriate measures by effectively representing complex issues, which can then *reinforce* the idea generation process. Like structuring, researchers note success will depend on nature of the phenomenon being measured and on the characteristics of the person measuring (Craig and Moores, 2005; Montemari and Nielsen, 2013). Studies also describe similar steps to foment idea generation and participation such as anonymity, providing time for discussion and revision, and techniques to elicit ideas prior to group sessions with a facilitator (Aranda and Arellano, 2010; Cugini *et al.*, 2011; Niebecker *et al.*, 2008; Parisi, 2013).

**P8: The elements of effective problem structuring can be extended to include performance management system development.**

While mapping for development appears to work in a similar way to problem structuring, it must be adapted to the challenges of the development context. For example, studies describe using maps as a means for discussion and arriving at consensus prior to investing in performance reporting infrastructure (Aranda and Arellano, 2010; Francioli and Cinquini, 2014; Montemari and Nielsen, 2013), though these descriptions are limited to systems within the financial industry. However, generally studies that take into consideration the complications that arise during implementation, and the role of strategy maps within these, are lacking.

### 3.4.3 Strategy maps for use

The following paragraphs evaluate the use of strategy maps to communicate, analyze, and evaluate performance.

**Table 3.3:** Studies addressing the use of strategy maps

| Source | Principal Findings | Map Type | Map Complexity (Nodes) | Task Setting |
|---|---|---|---|---|
| Handoko & Wehartaty, 2017 | Performance information communicated via strategy map → reduced motivated reasoning (+)*, E | Hierarchical | < 10 | Individual |
| Hu et al. 2017 | Use of map for communicating performance, compared to traditional report → understanding of the performance information(+)*, E | Hierarchical | < 10 | |
| Strohhecker, 2016 | Use of strategy map to analyze performance → decision making performance (+) NS, E | Hierarchical | < 25 | |
| Humphreys et al. 2016 | Inclusion of time delays with strategy map feedback → improved decision-making*, E | Hierarchical | < 25 | |
| Cheng & Coyte, 2014 | Results communicated with strategy map → Propensity for Knowledge Sharing and Extra-role behaviors (+)* (only with subjective incentive scheme), E | Hierarchical | < 10 | |
| Cheng & Humphreys, 2012 | Information presented in strategy map → decision making (+), E | Hierarchical | < 10 | |
| Rompho, 2012 | Information presented in strategy map → decision making (+) NS, E | Hierarchical | < 25 | |
| Farrell et al. 2012 | Narrative links → improved decision making (+), E | Narrative links | < 10 | |

**Table 3.3 Continued from previous page**

| Source | Principal Findings | Map Type | Map Complexity (Nodes) | Task Setting |
|---|---|---|---|---|
| Mastilak et al. 2012 | Use of a strategy map → Perception of controllability of results (+), E | Hierarchical | < 10 | |
| Booker et al. 2011 | Presentation of narrative information → perception of predictive capacity of measure (+), E | Narrative links | N/A | |
| Banker et al. 2011 | Information presented in strategy map → decision making (+), E | Hierarchical | < 10 | |
| Frederiksen et al. 2011 | Use of map prior to simulation task → task performance (+)* <br> Use of map during simulation task → task performance (-)*, E | Cybernetic Strategy | < 25 | |
| Lowe et al. 2011 | Use of integrated map as decision aid → focus on financial performance (-)* <br> Use of compensatory map as decision aid → focus on financial performance (-)* <br> Moderated by tolerance for ambiguity (effect of integrated map +) , financial background (effect of integrated map (+)), E | Hierarchical | < 10 | |
| Carmona et al. 2011 | Pyramid map type (vs. silo) → emphasis on financial results (-), <br> moderated by reward structure (NS) and National culture (NS), E | Hierarchical | < 10 | |

**Table 3.3 Continued from previous page**

| Source | Principal Findings | Map Type | Map Complexity (Nodes) | Task Setting |
|---|---|---|---|---|
| Humphreys & Trotman, 2011 | Use of maps for communication of performance results → Reduced common measures bias (when all measures are strategically linked) (+), E | Hierarchical | < 10 | |
| Tayler 2010 | Information presented in strategy map → motivated reasoning (-)*, E | Hierarchical | < 10 | |
| Laitinen et al. 2010 | Perceived causality of between measures → Satisfaction with Performance Measurement System (NS), S | N/A | N/A | |
| Vera-Munoz et al. 2007 | Communication of performance with strategy map → decision making (+), E | Hierarchical | < 10 | |
| Wong-on-Wing et al. 2007 | Use of maps for communication and analysis → Reduced bias in evaluating performance (+), E | Hierarchical | < 10 | |
| Dilla & Steinbart, 2005 | Communication of tabular displays or graphs → improved decision making, consensus, and consistency (all NS), E | N/A | N/A | |
| Vo, 2005 | Map Complexity → Satisfaction (-), E | Hierarchical + Cybernetic | < 25 | |
| Banker et al. 2004 | Communication of performance with strategy map → decision making (+), E | Hierarchical | < 10 | |

**Table 3.3 Continued from previous page**

| Source | Principal Findings | Map Type | Map Complexity (Nodes) | Task Setting |
|---|---|---|---|---|
| Langley & Morecroft, 2004 | Strategic Map Decision Aid → long-term learning (NS), E | Hierarchical | < 10 | |
| Francioli & Cinquini, 2014 | Use of BSC strategy map → strategy execution, communication (+), C | Hierarchical | < 25 | In Group |
| Lucianetti, 2010 | Use of strategy map for performance analysis → Improving internal communication among people (NS) <br> Aligning action with strategy (+) <br> Building consensus around the organization's vision and strategy (+) <br> Enhancing time and efforts on strategic related issue (+) <br> Making strategy everyone's day job (+), S | N/A | N/A | |
| Aranda & Arellano, 2010 | Communicating strategy through a map, with time for discussion of content and relevance with peers → Consensus about strategy (+), Effect more pronounced for non-financial performance E | Hierarchical | < 25 | |
| Malina et al. 2007 | Validity of Causal Relations → Improved Decision Making (NS), C | Hierarchical | < 10 | |

**Table 3.3 Continued from previous page**

| Source | Principal Findings | Map Type | Map Complexity (Nodes) | Task Setting |
|---|---|---|---|---|
| Notes: '+' signifies a positive correlation; '-', a negative correlation; '*': partially supported; NS: Non-significant results. Methods: C: Case Study, P: Participatory Workshop(s), E: Experimental Design, S: Survey, A: Action Research. Only variables related to strategy maps are included in this table. | | | | |

Source: The Author

Overall, there is little compelling evidence that similar results cannot be achieved through other, less costly means of communication, when the aim is communication of performance in general. However, some experimental tasks found in this study report small positive effects, and so the conditions that might bring these about will be considered.

**Conditions for processing**

The argument behind using maps for evaluative tasks is that these are effective at communicating complex information in a way that facilitates understanding because the human mind processes the information effectively (Strohhecker, 2016). However, results are mixed for connecting the use of strategy maps for learning, suggesting that the use of maps for evaluation and communication will be limited compared to use for structuring problems. Several studies showed a small positive correlation between use of strategy maps and learning outcomes (Banker *et al.*, 2011; Banker *et al.*, 2004; Cheng and Humphreys, 2012; Farrell *et al.*, 2012; Frederiksen *et al.*, 2011; Hu *et al.*, 2017; Humphreys *et al.*, 2016; Lowe *et al.*, 2011; Mastilak *et al.*, 2012; Tayler, 2010; Vera-Muñoz *et al.*, 2007).

Individual characteristics that were found to be influential were tolerance for ambiguity (Lowe *et al.*, 2011), education and training (Lowe *et al.*, 2011), and prior involvement in developing the strategy map (Aranda and Arellano, 2010; Tayler, 2010). The results of Carmona *et al.* (2011) draw attention to interaction effects with the reward structure, where these may amplify behavioral effects of using the maps. This highlights a danger noted in previous discussions (Tayler, 2010) that participation in a report's design can contribute to motivated reasoning.

There is an interest in connecting the properties of maps to decision making performance. Here, some evidence suggests that the link–node structure may communicate the importance of non-financial issues compared with other forms of performance reporting (Aranda and Arellano, 2010; Carmona *et al.*, 2011; Lowe *et al.*, 2011). However, two experimental studies returned insignificant results and found that participants

ignored strategy map communications to some degree (Humphreys *et al.*, 2016; Rompho and Siengthai, 2012; Strohhecker, 2016). Overall, there appears to be a limit on how effective strategy maps can be during timed decision-making tasks. Several authors attribute this limit to the nature of mental models, proposing that strategy maps may help in their formation to a certain extent, after which they will likely be ignored (Frederiksen *et al.*, 2011; Humphreys *et al.*, 2016; Langley and More-croft, 2004; Rompho and Siengthai, 2012).

**P9: Strategy maps will be effective for facilitating initial communication of strategy to groups with low subject-matter knowledge, such as across functional areas.**

Concerning map styles that lend themselves to analysis, there were several styles of strategy map described in these studies and these appear to influence outcomes to some degree. These can be hierarchical, display performance drivers, or cybernetic, which contain feedback loops. In addition, there is some evidence that a strategy map may be able to communicate certain types of information, such as feedback loops and time delays, which other types of communications will not (Hu *et al.*, 2017; Humphreys *et al.*, 2016; Strohhecker, 2016). As map complexity increases, satisfaction with the map appears to decrease (Vo *et al.*, 2005), in line with research on information overload and suggestions to limit the complexity in communications (Aranda and Arellano, 2010). There is some limited support that the combination of the categories of the Balanced Scorecard together with the strategy map leads to improvement in learning outcomes (Carmona *et al.*, 2011; Lowe *et al.*, 2011).

**P10: Strategy maps are effective at communicating complex information such as time delays and feedback loops, over traditional performance reports, but overly complicated reports will confuse and possibly frustrate evaluators.**

## Strategy maps in strategic evaluation

Importantly, the results discussed above come largely from experimental settings where the idea performance is unproblematic, *i.e.* operationalized and interpreted by the researcher, often operationalized as task performance. The maps themselves are often simple—fewer than 10 nodes—conflicting with the more complex maps developed in organizations (Aranda and Arellano, 2010; Malina *et al.*, 2007) and with those created during problem structuring. Therefore, benefiting from communicating via strategy maps requires understanding in which situations these are most likely to be appropriate.

## P11: Strategy maps will be effective for evaluation when used as a basis for problem structuring and interactive use.

In contrast to interactive use, diagnostic use is periodic or exceptions-based, and used primarily for control purposes (Simons, 1995; Tessier and Otley, 2012). In these cases, there is little evidence found in this review to suggest that strategy maps are well suited for this purpose. And yet, the majority of the studies on evaluation in this review focus on this type of use. The notion that the links represent valid causal relations has been questioned (Norreklit, 2000), but most importantly, no study in this review reported diagnostic control outside of experimental settings in the form of evaluating the validity of links (whether causally or as means–ends relations), and two discuss significant barriers to carrying these out (Francioli and Cinquini, 2014; Malina *et al.*, 2007). Rather, these studies highlight the activity centering around the development and discussion of strategy map reports, in which the causal relations go untested. Further, some authors have suggested (Frederiksen *et al.*, 2011) that strategy maps will be most useful for evaluation if they are processed *before* they are needed for decision making. These results in combination with longitudinal studies (Aranda and Arellano, 2010; Francioli and Cinquini, 2014) suggest that maps will be ill-suited to the demands of frequent diagnostic use, especially when strategy changes

frequently.

**P12: Strategy maps will be effective for diagnostic use only in environments where strategic change is low, else they will be overly restrictive.**

## 3.5   Discussion

The results suggest that the process of creation is what lends the map its power, through its abilities as a tool for reflection, and the learning that can take place when they are created, discussed, and revised. The literature often discusses maps and mapping as a relatively easy way to attain strategic alignment and organizational performance. However, the performance management processes of problem structuring, development, and finally use provide many opportunities for failure. The following section will discuss the findings with an eye to reducing this risk by exploring how maps are meant to work in each and across stages.

### 3.5.1   Strategy maps for problem structuring

Performance measurement begins with forming an idea of what to measure and manage, and strategy mapping seems to present an ideal way to represent and learn about generally complex organizational strategies. This review concentrates on several mechanisms that might bring about this learning, and reflecting on these can guide practice and future research.

The first concerns how mapping can lead to learning for the individual, i.e. the mechanisms that take place largely within the mind when creating a series of nodes and links. Generally, this review supports the observation of Öllinger *et al.* (2015) that within the performance measurement literature theoretical discussions are underdeveloped. This synthesis suggests that the benefits can be explained through externalization, inclusion, reinforcement, and finally by offering choice.

These are worth considering within the context of performance measurement for the possible benefits of using strategy maps in combination

with other elements of performance measurement. For example, the original Balanced Scorecard report and its requirement for measures to come from multiple categories appears to complement the strategy map building exercise, as the requirement to have a variety of measures from different categories can yield richer, more complete representations of strategy (Hodgkinson *et al.*, 2004). Further exploration of these synergies could result in interesting new lines of research. For example, there is little discussion of possible pitfalls of the strategy mapping process apart from one reported failure caused by disagreement (Langfield-Smith, 1992). Are there situations in which these could do more harm than good?

The discussion of elicitation, setting, and group dynamics goes well beyond the typical treatment the process of creating strategy maps receives in performance measurement literature, which often presents maps as if their creation is unproblematic. Researchers and practitioners should therefore be aware of the difficulties in creating strategy maps. Otherwise, they may result in more instead of less disagreement.

### 3.5.2 Strategy maps for system development

If development can be explained using the mechanisms of problem structuring as suggested by this synthesis, then the key gap in researching strategy maps for development are studies that consider the many potential sources of failure within the development process, such as those enumerated by (Van Camp and Braet, 2016). For example, the development process is complex, often includes multiple actors, can take years (Craig and Moores, 2005; Franco-Santos and Bourne, 2003), and may be the most likely stage of failure (Neely *et al.*, 2000). Generally, evidence was supportive of the potential of a strategy map to promote successful development outcomes, but there were few descriptions of the process (Aranda and Arellano (2010) and Francioli and Cinquini (2014) are notable exceptions), whether that was using strategy maps to develop performance measures for use, developing strategy map-style communications, or both.

The evidence in this review suggests that when strategy maps are used as a continuation of the strategic dialog begun during problem structuring, then it is more likely to result in better performance measurement systems. Reviewed texts were generally favorable the effects of participation in development, which coincide with other studies in performance measurement on "buy-in" created through participation in development (Groen *et al.*, 2012). Participation in development holds the risk of leading to biases (Tayler, 2010). In theory, at least, using the strategy map as a tool for fomenting debate could prevent these biases from unbalancing the measurement system. But researchers and practitioners should be aware that if the benefits of mapping are explained in large part through inclusion, and that this is brought out in part to the extent that the mapping process is seen as fair, then care is needed in how the ideas are implemented so as not to bring about dysfunctional effects (Franco-Santos and Otley, 2018).

Therefore, there is an interesting opportunity for studies that observe strategy maps in the processes of development and implementation specifically to learn more about how they can or cannot help navigate the complex development process, especially for aligning the various elements of performance management systems to organizational strategy.

### 3.5.3 Strategy maps for use

Two mechanisms are presented to explain how strategy maps can lead to better decision making and organizational performance. For individuals communicating or analyzing maps, the power of the map has been described as resting in its ability to show causal relations and relevant information and so facilitate processing. The results of this review suggest that more research building on links to cognitive psychology in the line of Dilla and Steinbart (2005) and Cheng and Humphreys (2012) could help develop a theory of when strategy maps will be *most effective* for communication and evaluation, especially when used diagnostically.

More importantly, this review highlights that experimental studies with tightly defined notions of performance and short time limits are a

poor reflection of how maps are used for communication in organizations, though admittedly this could be due to selection bias or limitations of the review. Nevertheless, studies focusing on decision-making contrast with descriptions in the field (Aranda and Arellano, 2010; Francioli and Cinquini, 2014), where the strategy map serves as tool for on-going discussion over long periods of time, and in which manger-participants had the opportunity to analyze, question, and importantly to refine the strategy maps presented to them. It appears again that the strength of maps is not primarily in their ability to communicate, but rather in their suitability for structuring problems and developing a balanced, complete measurement system. In this way, they do appear to serve as a medium for achieving "double-loop" learning and can result in the kind of transformative outcomes described in (Kaplan and Norton, 2004), subject to the constraints and difficulties described for the previous stages.

## 3.6  Conclusions

If the ultimate concern of performance management is the improvement of performance, strategy maps and strategy mapping appear to be suited to making an important contribution. This review has explored the mechanisms that explain how strategy maps can be used to facilitate strategy formation, performance management system development, and strategy evaluation and communication. The studies in this review provide some examples of positive outcomes for all of these, but also negative ones. But is it worth it to pursue further research when adoption is low? The evidence available suggests that strategy maps are not reaching their potential for performance management.

The results of this review suggest that the issue can be resolved in part through a change in research direction. A part of the issue is a mismatch between research focus and organizational reality. To fully utilize strategy maps within performance management, researchers will need to better understand how these can integrate with other performance management components. Doing so will require shifting focus from evaluative tasks for diagnostic use—representing the majority of re-

search on evaluation—to observing how these function in organizations and how they can support the overall strategic dialog. Experimental research is helpful for better understanding the behavioral effects of these maps, and yet they neglect the difficulty in developing and implementing them for use in organizations generally operating in conditions of frequent strategic change (Porporato *et al.*, 2017).

Therefore, the first contribution of this review is to highlight the importance of differentiating these processes in order to analyze how maps work in organizations. A practical benefit of this separation is that it could make the benefits of strategy mapping more accessible. Strategy mapping for structuring problems, for example, does not necessarily require a large investment that would be required to implement a tool capable of permitting such use.

The second contribution of this review is to begin to separate the theory of strategy maps from any particular tool, which in performance management is generally the Balanced Scorecard. The review offers what could be considered a "mechanism sketch" (Craver, 2006), a baseline categorization of the critical features, processes, and actors that can explain how strategy maps generate the outcomes of interest. Given the realist assumption of openness, the exact way that these features interrelate will vary from situation to situation, but the mechanism should remain constant.

Through the synthesis process, this review offers 12 propositions on how strategy maps will work, for which purpose, and in what circumstances, following the generative mechanism view. Future research within performance management can build upon these to further understand and explain how maps work in which circumstances. More research is needed to understand, for example, how the use of strategy maps for evaluation might lead to unintended, potentially negative impacts when they are combined with existing incentive structures (Cheng and Coyte, 2014; Mastilak *et al.*, 2012), but there is also a need to explore interactions with target setting, defining KPIs, information flows, and other performance management components. Doing so opens up

the possibility of discovering new uses and new synergies for strategy maps.

Separating the theory from the tool is also important because it can help explain and address failures at different levels. Distinguishing level could help explain why, for example, strategy maps could effectively improve communications across groups, but lead to poor decision making in an evaluative task. The view offered here is that understanding the two requires a consideration of largely different levels, one primarily cognitive, the other situated in and conditioned by organizational level elements. Perhaps most importantly, it is hoped that this review will help the strategy map take its own place within performance management study, and to evolve in the rapidly changing organizational context (Bititci *et al.*, 2012).

The review represents one of very few realist syntheses in management studies, though recent calls for more reviews of this type highlight their perceived potential (Jones and Gatrell, 2014). By focusing on the underlying theory of how strategy maps are meant to work, the review opens new lines of questioning that could be of interest to performance measurement and management.

Although the findings are encouraging, the review is limited in several ways. Perhaps most importantly, by taking a broad view of strategy maps across three stages of performance management, nuance has been sacrificed in the analysis of each. While maintaining sufficient breadth is useful for considering strategy maps within performance management at a high level, future studies will be needed to better establish particular configurations of elements that generate outcomes. This is not a call for lists in the form of context, mechanism, outcome, but rather for continued focus on building nuanced explanations of strategy maps.

The findings of this paper could be important for practitioners using or considering to adopt the use of strategy maps. First, it highlights that creating strategy maps is a highly accessible activity for achieving shared understanding of what organizations do and how they do it, even among diverse groups of stakeholders. The benefits can be carried

over to develop or implement appropriate performance measures, where they serve as a focus point for discussion to link measures to strategy. Conversely, practitioners should proceed with caution before investing in strategy map-style reports for communicating performance for diagnostic use. Not only are there multiple challenges to developing such reports, but they may have unintended effects on behavior or may simply be ignored.

For research on performance management, this synthesis has highlighted several research gaps in the discussion which could benefit from further investigation. By extracting and evaluating the existing theory of how strategy maps work and in what circumstances, both researchers and practitioners alike can move towards realizing the full potential of strategy maps in performance management.

**Chapter 3 Appendix**

**Table 3.4:** Studies included in review

| Author(s) | Year | Journal | Methodology | Stage | Participants | Map Complexity** | Map Type | Development Method | Elicitation Technique |
|---|---|---|---|---|---|---|---|---|---|
| Handoko and We-hartaty | 2017 | Polish Journal of Management Studies | Experimental | USE | Students | Basic | Hierarchical | | |
| Hu *et al.* | 2017 | European Journal of Operational Research | Experimental | USE | MBA Students | Mid | Hierarchical | | |
| Ackermann *et al.* | 2016 | Group Decision and Negotiation | Case Study | STR | Organizations in negotiation | Mid | Hierarchical | Workshop | Direct |
| Humphreys *et al.* | 2016 | The Accounting Review | Experimental | USE | Graduate Students | Basic | Hierarchical | | Indirect |
| Strohhecker | 2016 | Journal of Management Control | Experimental | USE | Students | Mid | Hierarchical | | |
| Öllinger *et al.* | 2015 | Educational Technology Research and Development | Experimental | STR | Undergraduate Students | Varied | Hierarchical | | Direct |
| Ackermann *et al.* | 2014 | European Journal of Operational Research | Participatory Workshop(s) | STR | Senior Managers | Mid | Cybernetic | Workshop | Direct |
| Cheng and Coyte | 2014 | Management Accounting Research | Experimental | USE | Graduate Students | Basic | Hierarchical | | Indirect |

**Table 3.4 Continued from previous page**

107

| Author(s) | Year | Journal | Methodology | Stage | Participants | Map Complexity** | Map Type | Development Method | Elicitation Technique |
|-----------|------|---------|-------------|-------|--------------|------------------|----------|--------------------|-----------------------|
| Francioli and Cinquini | 2014 | Journal of Accounting and Organizational Change | Case Study | STR, DEV, USE | Managers | Mid | Hierarchical | | Direct |
| Goodier and Soetanto | 2013 | Journal of Maps | Participatory Workshop(s) | STR | UK Construction Industry Experts | Mid | Hierarchical | Workshop | Direct |
| Gouttenoire *et al.* | 2013 | Agronomy for Sustainable Development | Participatory Workshop(s) | STR | Organic Farmers | Complex | Cybernetic | Workshop | Direct |
| Montemari and Nielsen | 2013 | Journal of Intellectual Capital | Case Study | STR, DEV | Network of organizations in the same value chain | Mid | Cybernetic | Workshop | Indirect |
| Parisi | 2013 | Studies in Managerial and Financial Accounting | Action Research | STR, DEV | Pharmaceutical Company | Complex | Cybernetic | Aggregate + Congregate | Indirect |
| Cheng and Humphreys | 2012 | The Accounting Review | Experimental | USE | Graduate Students | Basic | Hierarchical | | Indirect |

**Table 3.4 Continued from previous page**

| Author(s) | Year | Journal | Methodology | Stage | Participants | Map Complexity** | Map Type | Development Method | Elicitation Technique |
|---|---|---|---|---|---|---|---|---|---|
| Farrell *et al.* | 2012 | Journal of Management Accounting Research | Experimental | USE | Undergraduate Business Students | Basic | Narrative links | | Indirect |
| González *et al.* | 2012 | Total Quality Management & Business Excellence | Case Study | STR | Business Executives | Mid | Hierarchical | Aggregate | Hybrid |
| Mastilak *et al.* | 2012 | Journal of Management Control | Experimental | USE | MBA Students | Basic | Hierarchical | | Indirect |
| Rompho and Siengthai | 2012 | Measuring Business Excellence | Experimental | USE | MBA Students | Mid | Hierarchical | | Indirect |
| Banker *et al.* | 2011 | International Journal of Accounting Information Systems | Experimental | USE | Graduate Management Students | Basic | Hierarchical | | Indirect |
| Booker *et al.* | 2011 | Advances in Accounting | Experimental | USE | Graduate Management Students | Mid | Narrative links | | Indirect |
| Carmona *et al.* | 2011 | Advances in Accounting | Experimental | USE | Executive MBA Students | Basic | Hierarchical | | Indirect |

**Table 3.4 Continued from previous page**

| Author(s) | Year | Journal | Methodology | Stage | Participants | Map Complexity** | Map Type | Development Method | Elicitation Technique |
|---|---|---|---|---|---|---|---|---|---|
| Cugini *et al.* | 2011 | Public Money and Management | Experimental | STR, DEV | University department | Mid | Hierarchical | Aggregate | Hybrid |
| Frederiksen *et al.* | 2011 | Learning and Instruction | Experimental | USE | Undergraduate Students | Mid | Cybernetic | | Indirect |
| Humphreys and Trotman | 2011 | Journal of Management Accounting Research | Experimental | USE | MBA Students | Basic | Hierarchical | | |
| Lowe *et al.* | 2011 | Accounting and Business Research | Experimental | USE | Executive MBA Students | Basic | Hierarchical | | Indirect |
| Van den Bossche *et al.* | 2011 | Instructional Science | Experimental | STR | Undergraduate Students | Mid | Hierarchical | | Indirect |
| Xu | 2011 | Gender in Management | Experimental | STR | Undergraduate Business Students | Unknown | Unknown | | Direct |
| Aranda and Arellano | 2010 | Journal of Management Accounting Research | Experimental | STR, DEV | Savings Bank Employees | Mid | Hierarchical | | Direct |
| Goodier *et al.* | 2010 | Futures | Experimental | STR | Practitioners, various | Mid | Hierarchical | Hybrid | Hybrid |

**Table 3.4 Continued from previous page**

| Author(s) | Year | Journal | Methodology | Stage | Participants | Map Complex-ity** | Map Type | Development Method | Elicitation Technique |
|---|---|---|---|---|---|---|---|---|---|
| Laitinen *et al.* | 2010 | International Journal of Accounting, Auditing and Performance Evaluation | Survey | USE | CEOs | Mid | N/A | | N/A |
| Lucianetti | 2010 | International Journal of Business Performance Management | Survey | STR, DEV, USE | Managers | Unknown | Unknown | | Unknown |
| Pinch *et al.* | 2010 | Geoforum | Participatory Work-shop(s) | STR | Design Organizations | Mid | Hierarchical | Workshop | Direct |
| Tayler | 2010 | The Accounting Review | Experimental | DEV, USE | MBA Students | Basic | Hierarchical | | Indirect |
| Tegarden *et al.* | 2010 | Accounting Education | Participatory Work-shop(s) | STR | Academics | Mid | Cybernetic | Workshop | Direct |
| Shaw *et al.* | 2009 | International Journal of Management and Decision Making | Participatory Work-shop(s) | STR | Managers | Mid | Hierarchical | Workshop | Direct |

**Table 3.4 Continued from previous page**

| Author(s) | Year | Journal | Methodology | Stage | Participants | Map Complexity** | Map Type | Development Method | Elicitation Technique |
|---|---|---|---|---|---|---|---|---|---|
| Tegarden *et al.* | 2009 | Group Decision and Negotiation | Case Study | STR | Executives | Mid | Hierarchical | | Hybrid |
| Kunc | 2008 | Management Decision | Experimental | STR | Students | Mid | Cybernetic | Congregate | Direct |
| Niebecker *et al.* | 2008 | International Journal of Managing Projects in Business | Participatory Workshop(s) | STR, DEV | Managers | Mid | Hierarchical | Workshop | Direct |
| Malina *et al.* | 2007 | Contemporary Accounting Research | Case Study | USE | Fortune 500 Company | Basic | Hierarchical | | Indirect |
| Vera-Muñoz *et al.* | 2007 | Contemporary Accounting Research | Experimental | USE | Public Accountants | Basic | Hierarchical | | Indirect |
| Wong-on-wing *et al.* | 2007 | Accounting, Organizations and Society | Experimental | USE | MBA Students | Basic | Hierarchical | | |
| Ackermann and Eden | 2005 | Group Decision and Negotiation | Participatory Workshop(s) | STR | Managers | Mid | Hierarchical | Workshop | Hybrid |
| Craig and Moores | 2005 | Family Business Review | Case Study | STR | Managers | Mid | Hierarchical | Aggregate | Direct |

111

**Table 3.4 Continued from previous page**

| Author(s) | Year | Journal | Methodology | Stage | Participants | Map Complexity** | Map Type | Development Method | Elicitation Technique |
|---|---|---|---|---|---|---|---|---|---|
| Dilla and Steinbart | 2005 | International Journal of Accounting Information Systems | Experimental | USE | Students | Mid | N/A | | N/A |
| Vo *et al.* | 2005 | Causal Mapping for Research in Information and Technology | Experimental | STR, USE | Practitioners, various | Mid | Hierarchical + Cybernetic | Aggregate, Congregate, and Workshop | Hybrid |
| Banker *et al.* | 2004 | The Accounting Review | Experimental | USE | MBA Students | Basic | Hierarchical | | Indirect |
| Hodgkinson *et al.* | 2004 | Organizational Research Methods | Experimental | STR | MBA Students | Mid | Hierarchical | | Hybrid |
| Langley and Morecroft | 2004 | European Journal of Operational Research | Experimental | USE | MBA Students | Basic | Hierarchical | | Indirect |
| Shaw | 2004 | International Journal of Innovation and Learning | Participatory Workshop(s) | STR | Managers | Mid | Hierarchical | Workshop | Direct |
| Jenkins and Johnson | 1997 | British Journal of Management | Case Study | STR | Business Owners | Mid | Hierarchical | | Indirect |
| Cossette | 1992 | Journal of Management Studies | Case Study | STR | Owner / Manager | Mid | Cybernetic | | Hybrid |

Table 3.4 Continued from previous page

| Author(s) | Year | Journal | Methodology | Stage | Participants | Map Complexity** | Map Type | Development Method | Elicitation Technique |
|---|---|---|---|---|---|---|---|---|---|
| Langfield-Smith | 1992 | Journal of Management Studies | Participatory Workshop(s) | STR | Firefighters | Mid | Hierarchical | | Direct |

*STR: Problem structuring, DEV: Performance management system development, USE: use for communication, analysis, and evaluation

**Complexity is judged by the number of nodes: Basic: =< 10 Nodes, Mid: Between 10 and 25 Nodes. Complex: > 25 Nodes

Source: The author

End of table

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# Chapter 4

# Elaborating a critical realist approach to soft systems methodology

**Abstract**

**Purpose:**

This paper explores the implications of adopting a critical realist approach to soft systems methodology (SSM) both to address local problematic situations and to develop deeper explanations. However, its potential as a means for developing generalizable knowledge for management science has been limited due at least in part to its adherence to strong interpretivism.

**Methods:**

After exploring the history of soft systems methodology and basic tenants of critical realism, the paper builds on previous discussions of ways in which SSM is compatible with a critical realist approach. Next, the consequences for such an approach are considered by examining a case in which SSM was integrated into a critical realist approach for discovery as means to guide large-scale reform in a non-profit organization.

**Findings:** The case revealed that critical realism served as an effective guide both for incorporating existing knowledge as well as setting the stage for its possible modification.

**Originality / Value:** Opportunities and challenges in the approach are presented. Apart from the adoption of a realist ontology, a critical realist approach to SSM requires assuming a dual-role as an insider–outsider, which presents a number of challenges. However, it appears soft systems methodology are highly compatible and could serve to help bridge the practice–research gap.

**Keywords:**
critical realism, soft systems methodology, interdisciplinary studies, theory-practice gap, performance management systems

## 4.1 Introduction

Soft systems methodology (SSM) is an action-oriented methodology for framing and addressing problems in complex organizational contexts. Based primarily on the works of Peter Checkland (Checkland, 1980, 1983; Checkland and Scholes, 1990), it has been used in an widening range of research contexts (Hanafizadeh and Mehrabioun, 2018). SSM was originally offered as an alternative to a functionalist, rationalist view for solving problems in organizations, the outcomes of which were seen as limited (Checkland, 1983).

At the heart of Checkland's methodology is an interpretivist view that sees the system as a means to organize our thinking *in order to* gain understanding and address a situation perceived as problematic. This perspective has been criticized as a foundation for SSM (Jackson, 1991; Mingers, 2000a) because it ultimately limits the potential of the methodology in achieving its goal.

As an alternative, several works (Mingers, 2004; Mingers, 2000a, 2014) discuss adopting a critical realist perspective on SSM. Critical

realism is a philosophical approach that maintains a realist ontology, epistemological relativity, and judgmental rationality—that attempts to understand the world are separate from the world itself, but that we as humans may undertake processes of discovery and so learn about it, though not all of these attempts will be equally valid (Bhaskar, 1975). The approach has garnered increasing attention in management and organizational science as an alternative to positivism and interpretivism in that it appreciates the power of meaningfulness in social interaction while maintaining a realist position.

As a relatively new philosophy, many ideas within critical realism have yet to be developed in practical, applied settings (O'Mahoney and Vincent, 2014). Additionally, the concepts and terminology may be unfamiliar to many scholars. Specifically, detailed examples of critical realist approaches for specific methodologies exist but are not numerous, and no explicitly "critical realist" SSM has been elaborated, despite their supposed compatibility (Mingers, 2000a). Given the potential of SSM as an effective means of addressing field problems, this paper seeks to expand on critical realist ideas as they apply to SSM, exploring the implications and challenges of such an approach when applied to the study of organizations.

The study has two additional objectives. First, it is meant to generate discussion on a popular technique as a means not just for structuring organizational problems and planning for action but also for developing knowledge. Second, it seeks to make the the methodology more accessible by providing an illustrative example. The study addresses the following research question:

**RQ:** What are the implications of adopting a critical realist approach to soft systems methodology?

This paper considers what Bhaskar (2010) refers to as "first-wave" critical realism, centering on a relatively small portion of what has developed into a substantial philosophical approach. In so doing, the

interest is in the potential for SSM to assume a dual purpose of structuring and addressing problematic situations *and also* as a means to apply and refine knowledge of the structures and mechanisms that bring such situations about and which can be used in their resolution. This is no simple task, as Checkland (1983) sought to avoid the application of technical solutions in response to human problems.

After exploring the SSM approach, the paper compares a critical realist approach of inquiry, *RRREIC*, to the broad stages of SSM as presented by Checkland and Scholes (1990). Next, a case study in a non-profit organization serves to illustrate the approach and forms the basis of discussion of its implications.

## 4.2 Background

This section introduces SSM by exploring its origins, the general process, and its application to field work in various disciplines. Next, criticisms of the method related to the current discussion are explored, followed by a consideration of how adopting a critical realist approach could address these.

### 4.2.1 Origins and Applications

SSM originated from a series of works by Peter Checkland based on his and other researcher's work at the University of Lancaster, beginning in the 1960s (Checkland and Scholes, 1990). It originated in response to "hard" systems thinking, itself base on General Systems Theory of Von Bertalanffy (1968), which had been cited as lacking when applied to social situations (Checkland, 1983). The hard approach views the world as made up of systems that can be studied objectively, and in which the "problem", however complex, is clearly defined (Jackson, 1991).

In seeking to bring about positive change in organizations, SSM has become an action research approach in its own right (Baskerville and Wood-Harper, 1998), which departs from a hard systems approach by viewing the problem itself as problematic. As opposed to the engineering problems to which systems thinking had previously been applied, in

organizations and social settings a "problem" could be viewed in any number of ways, including as unproblematic, depending on the views of the stakeholder in question (Checkland, 1983). Thus, Checkland viewed the hard systems approach as maladjusted as a potential source for improvement difficult problem situations. Checkland adapted hard systems thinking in three primary ways: its primary objective became to improve areas of social concern through continuous learning, it adopted the idea of a "human activity system" or holon as opposed to seeing the world as made up of systems in a traditional sense, and it moved increasingly toward an interpretivist approach grounded in the phenomenology (Jackson, 1991; Zexian and Xuhui, 2010).

Along with the above changes, SSM evolved from a method which was presented as 7 steps into a more flexible approach to discovery and for addressing problem situations (Checkland and Scholes, 1990). So while early versions of SSM had distinct stages (Checkland and Scholes, 1990; Mingers, 2000a), more recent versions expressly avoid any such standardization, and each application of it "can be seen... as research into its use"(Checkland and Scholes, 1990, pp. 275). The method is, ideally, constantly evolving. Generally, however, it employs stages of finding out, expressing the problem situation, creating a model of the ideal system, comparing the real situation to the model, analyzing feasible and desirable change, and taking action (the steps listed in Table 2).

Concerning these stages, SSM begins with a process of finding out which continues throughout the project. The classic tool for representing the result, but which can also be a tool for finding out, is the creation of rich diagrams, graphical depictions of a problem situation meant to capture elements of the intervention, the social situation, and the political situation. Next, SSM moves to model building. The goal here is to develop an ideal type of the systems relevant to the problem situation. These are elaborated by conceiving a root definition which expresses the selected activity system as a transformation process, subject to environmental constraints. The traditional mnemonic for creating

129

models is CATWOE, which refers to the Customers who are affected by the transaction, the Actors, who carry out the transformation, the Transformation itself, the Worldview or *Weltanschauung* that make the transaction meaningful, the Owner, who could potentially stop the transformation, and Environmental constraints. The learning process results in great part to the subsequent comparison between the real situation and the model. Ideally, comparison allows participants to identify feasible and desirable change, and to take action.

It is important to stress that, while presented as a linear process, SSM is meant to be iterative, and later versions present increasingly flexible applications that see SSM as a means of *interacting* (Checkland and Scholes, 1990) with a problem, denominated Mode 2. An extreme, idealized form of Mode 2 sees SSM as "an entirely mental act of structured thinking" (Checkland and Scholes, 1990, pp. 286), and contrasts with an extremely rigid, interventionist approach to SSM (Mode 1).

Since its creation SSM has been applied in many management and organizational disciplines (Hanafizadeh and Mehrabioun, 2018; Mingers and White, 2010; Van De Water *et al.*, 2007).

### 4.2.2 Philosophical underpinnings of soft systems methodology

As mentioned in the previous section, SSM as presented by Checkland adopts an interpretivist position. This position is grounded primarily in the phenomenology of Alfred Schutz (Mingers, 1984). This sees the primary task of the social research as describing and understanding the meaning behind action.

**Table 4.1:** Functionalist and Interpretivist approaches compared

| Element | Functionalist Approach | Interpretivist Approach |
|---------|------------------------|-------------------------|
| Worldview | The real world is systemic | There are no presuppositions that the world is systemic |
| Systems View | Using the word 'system' to analyze the problematic situation | The problematic situation can be creatively designed, may not be defined by the term 'system' |

**Table 4.1 Continued from previous page**

| Element | Functionalist Approach | Interpretivist Approach |
|---|---|---|
| Use of models | Models can bring knowledge of the real world | Models are ideal types: possible human activity systems |
| Role of quantitative analysis | Quantitative analysis is useful | Quantitative analysis is limited to demographics |
| Role of knowledge | The intervening process is carried out on the base of professional knowledge | The intervention should be carried out by considering all stakeholders involved |
| Evaluation criteria | The resolution is evaluated by its effectiveness and efficiency | Evaluate the improvement according to effectiveness and related principles |

Source: Adapted from Zexian and Xuhui (2010)

End of table

Table 1 compares the interpretivist and functionalist approaches to systems thinking. Most importantly, SSM does not traditionally view a system as an "adaptive whole entity" (Atkinson and Checkland, 1988), but rather a type of organizing framework for viewing the world *in order to* gain understanding of it. From this perspective, human activities are not separated from their surroundings, and that parts of these may have their own purposes, objectives, and meanings. Therefore, under the interpretivist view these are seen as "models relevant to debate" and not "models of" (Atkinson and Checkland, 1988, p. 723).

Also relevant to the current discussion is the role of the researcher and of expert knowledge. The SSM of Checkland rejects the primacy of technical rationality (Jackson, 1991), the view that concrete management problems can be solved by applying the appropriate techniques and theories. Additionally, as opposed to the hard systems view, SSM is fundamentally and necessarily applied in nature, and can act as a means of developing experienced based knowledge (Zexian and Xuhui, 2010).

SSM has inspired a number of debates (Jackson, 1991; Mingers, 1984; Mingers, 2000a). Specifically, it has been argued that the interpretiv-

ist position prioritizes localized learning and results over generalizable discovery and exploration. Mingers (1984) notes: "subjectivist methodologies are valuable, particularly as an antidote to positivist views, but are not in themselves suitable for guiding social intervention". Specifically, an interpretivist stance can lead to theory–practice inconsistencies, especially if an attempt is made to generalize which stem from a relativist position of the truth (Smith, 2006). That much published research employing SSM is *about* SSM (Hanafizadeh and Mehrabioun, 2018) might evidence this difficulty.

### 4.2.3 A critical realist approach to Soft Systems Methodology

Systems thinking and critical realism share much in common (Mingers, 2014), and Mingers, 2000b argues that adopting a critical realist position for SSM would allow the researcher to avoid logical inconsistencies, but does not describe how one might go about it. Additionally, several authors have noted that critical realism could provide a suitable basis for dealing with philosophical issues in information systems (Smith and Johnston, 2014) and in management science in general (Mingers, 2000b). However, critical realism has developed a diverse following and its own vocabulary, which can be restrictive (O'Mahoney and Vincent, 2014). Therefore, this section will present some ideas of critical realism and relate these to SSM before elaborating a critical realist approach to SSM.

Since its original elaboration as *transcendental realism* (Bhaskar, 1975), what is now referred to as critical realism has garnered significant interest and developed several branches. As Mingers (2000b) provides a detailed discussion of many of the issues of concern here in relation to SSM, the following paragraphs will be limited to an overview of what Bhaskar (2010) referred to as "first-wave" critical realism: a realist ontology, epistemological relativism, and judgmental rationalism. Next, a critical realist process for discovery will be considered.

The original argument of critical realism was for a separation of ontology from epistemology, i.e. that a reality consisting of causally

efficacious entities, whether physical, social, or imagined, exists independently of human knowledge of it. However, unlike an empiricist view, which limits causality to series of observable events, critical realism sees entities as having causal powers, which may be exercised or not via the acting of generative mechanisms. Mechanisms, in turn, are conditioned by physical and social structures, which may vary by context and produce differing outcomes (Bhaskar, 2016). Thus, there is a stratification of reality consisting of observable events, events that are experienced (empirical), and an underlying real or "deep" (Fleetwood, 2014) in which mechanisms and structures exist. Thus a major aim of critical realist discovery is to identify these mechanisms as a means of developing more complete explanations.

In addition, in open systems, mechanisms operate simultaneously and at different levels of reality. Thus, reality is further stratified into levels, which Bhaskar (2010) refers to these as a "laminated totalities". Therefore, attempting a complete explanation (in the extent that this is possible) would require considering these levels, and further their type. For example, Bhaskar and Danermark (2006) list 7 types in disability research: physical, biological, psychological, psycho-social, socio-economic, cultural, and normative.

There are two consequences of level for the current discussion: First, depending on the level of interest, mechanisms can be understood as situational (macro-to-micro), action-formation (micro-to-micro), or transformational (micro-to-macro) (Brante, 2001; Hedström and Swedberg, 1998). Second, because disciplines tend to concentrate on a particular level and possible a particular type of mechanism, typically a multidisciplinary consideration will be necessary to approach a complete understanding of a given phenomenon (Bhaskar, 2010).

In developing explanations, critical realism remains epistemologically relative, i.e., potentially several means for discovery could serve depending on the nature of the subject, and therefore is open to a wide range of methodologies (Mingers, 2015). However, as reality must be interpreted via our experiences, the approximation of it that is arrived

at via study will always be corrigible. However, unlike strong interpretivism, each interpretation is not necessarily equally valid (Bhaskar, 1975).

Critical realism often follows a particular process for methodology for discovery. In applied research, this is the *RRREIC* process (Bhaskar, 2010, 2016), and begins with the *resolution* of a the observable entities in a complex situation. The observable elements of the situation have a deeper, real subsurface which also contains emergent properties. Therefore, the next stage, *redescription*, involves choosing a level of description based on what is perceived to be appropriate to the study.

The next stages are *retrodiction* of component causes to existing events or *retroduction* of possible mechanisms, *elimination* of competing alternatives, *identification* of the likely underlying generative mechanism(s), and finally *correction* of earlier findings in light of the study's results.

**Table 4.2:** Comparison of critical realism and soft systems inquiry

| Critical Realism | Soft systems Methodology | SSM Tools |
| --- | --- | --- |
| Resolution | Finding out | Rich diagrams Analyses 1, 2 & 3 |
| Redescription | Expressing the problem and the ideal | CATWOE Analysis Developing root definitions The 3-5 E's Conceptual models |
| Retroduction or Retrodiction | | |
| Elimination | Comparison of models to real world | |
| | | Continued on next page |

**Table 4.2 Continued from previous page**

| Critical Realism | Soft systems Methodology | SSM Tools |
|---|---|---|
| Identification | Analyzing feasible and desireable change | |
| Correction | Taking action | |

Source: The Author

End of table

Table 2 compares the stages of SSM and its tools for analysis. There are similarities between these, and the basic processes of SSM map roughly to *RRREIC*. The fundamental difference in adopting a realist ontological position means that SSM asks no retroductive nor retrodictive question ("*e.g.*how must the world be for the problematic situation to be so?"), and thus the focus of explanation building in SSM centers on understanding the meaning of participants, rather than the underlying mechanisms.

Also, what could be seen as redescription in SSM (expressing the problem) explicitly rejects the imposition of theory outside of a theory of SSM (Mingers, 2000b). Therefore, while critical realism supports a conscious (if critical) integration of existing theory, SSM works solely in the context of the study, where SSM users express the perception of the real problem and the ideal through rich diagrams, CATWOE analysis, and conceptual models. Here, worldview is the most important to understanding and addressing the problem situation.

## 4.3 Illustrative Case Study

An SSM project employing a critical realist grounding will be used to illustrate the approach and as a means to discuss challenges and opportunities thereof. The project centered on a non-profit association based primarily in Barcelona, Spain, and began in the fall of 2017. The case will be particularly useful for illustration because, on the one hand, it addressed a complex situation in which both goals and proposed means

were seen as problematic. Thus, the setting is appropriately "messy" for applying SSM. On the other hand, it also had an explicit aim to develop organizational theory, and performance measurement and management theory in particular.

### 4.3.1 Case Background

Formed by a community of scientists and those interested in scientific issues, the goal of the organization is to encourage debate and community engagement, and to provide learning opportunities for early career researchers. To achieve these goals, the association organizes numerous activities throughout the year, which include organized discussions and debates with prominent members of the scientific community, social events, networking, and media campaigns. The activities are carried out by a team of approximately 80 volunteers led by the association president and a directing committee. Funding comes from small grants, ticket sales, and fees for organizing events.

At the time of the study, SciDF reported a number of challenges which led the researcher to propose the SSM project, represented in Figure 2. The association had been successful in organizing several events with high attendance, and had garnered media attention for highlighting a lack of debate on scientific topics in an important regional election. At the same time, initial interviews revealed a number of challenges, including significant volunteer turnover, a failure to meet commitments, and unclear objectives. Also, the association itself was evolving rapidly, considering expansion to other locations and hiring full-time employees.

### 4.3.2 Research approach

Figure 1 outlines the methodology followed in the case study. The stages involved will be presented as a means for discussion.

The process of inquiry initially centered on the creation of rich diagrams of the problem situation and of ideal models. Elements were re-described through an iterative process in which observation and rich diagram creation was incorporated with literature from the field of per-

**Figure 4.1:** Illustrated research approach
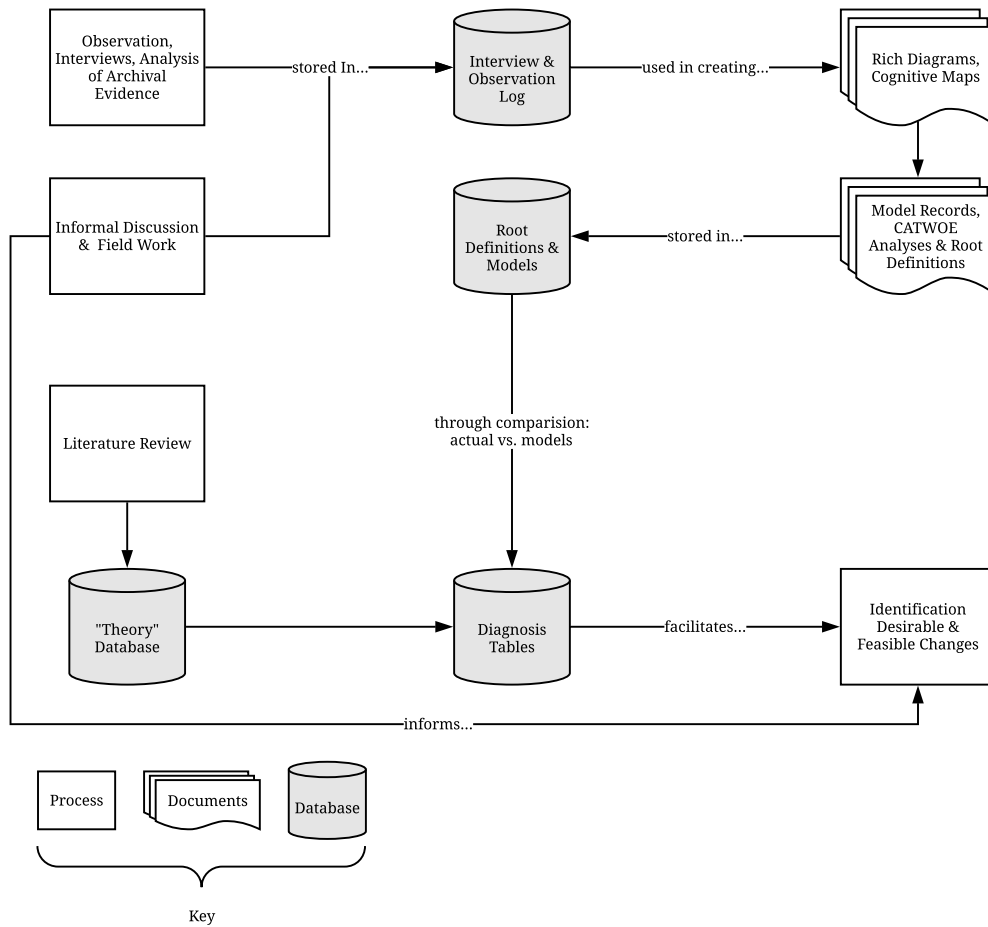


formance measurement and management, a multidisciplinary subject within organization and management studies. The use of these databases was meant to facilitate the development of scientific knowledge, an ambition that will be revisited in a later section of this paper.

### 4.3.3 Data Collection

SSM is inherently applied, and in this study the researcher assumed an active role in the organization as an insider (Groen *et al.*, 2012; Suomala *et al.*, 2014). After discussing the project with the directing committee, the research actively participated in organizing events as a volunteer. Participating gave rise to several observations that would not otherwise

have been possible, but also resulted in tensions.

To help create a more complete understanding of the problem situation, observations from the field were recorded in an observation log (Figure 1) if these were used in any of the *RRREIC* processes, along with notes from four semi-structured interviews with members of the organizing committee. The diagrams and models resulting from the interviews were shared with interviewees to develop them further. The researcher also participated in team meetings, multiple discussions, and was involved in the activities of the organization as a volunteer.

From these observations, the problem situation was re-envisioned as a problematic performance measurement and management system. Performance measurement and management is a broad topic within organization and management studies, which draws primarily from research in information systems, accounting, operations, and human resources (Choong, 2014b; Franco-Santos *et al.*, 2007). Essentially, performance measurement and management involves attributing value to goals and objectives, establishing targets and rewards, controlling and/or empowering performance, and establishing appropriate information flows (Ferreira and Otley, 2009). Behind the study of these systems is a search for improved organizational performance, where performance can be understood as the achievement of organizational objectives.

Delimiting the problem in this way served two purposes. First, the topic addressed may of the stated challenges, especially around structuring problems in the form of strategic goals, defining measures of performance, and communicating feedback information. Next, centering on performance measurement and management limited the scope of the literature review to this topic, a critical element for understanding the problem situation and its antecedent causes in the study. Theories of mechanisms were drawn from a concurrent systematic review which was adapted for the purposes of this study. Specifically, the research employed a review of challenges and sources of failure for performance measurement and management systems, Van Camp and Braet (2016), as a base, and incorporated other studies as needed that had been gathered

following a process of realist synthesis (Pawson, 2006). The sources of failure were re-interpreted from a critical realist view in the form of supposed underlying mechanism, its type (Hedström and Swedberg, 1998), and level.

For example, Van Camp and Braet (2016) list "Unbalanced amount" of non-financial and financial performance measures as a potential cause of failure. This cause of failure would be incomplete for the purposes of the study, which seeks to understand why such an imbalance would be problematic. Further exploration provided nuance: non-financial measures tend to provide more information (Lau, 2011), so an over-reliance on these can result in feelings of ambiguity, which in turn can spur a number of undesirable behavioral outcomes (Widener, 2007). These potential explanations were stored in a table to aid in further processes of elimination and identification.

**Figure 4.2:** Textual content of rich diagram used for model creation
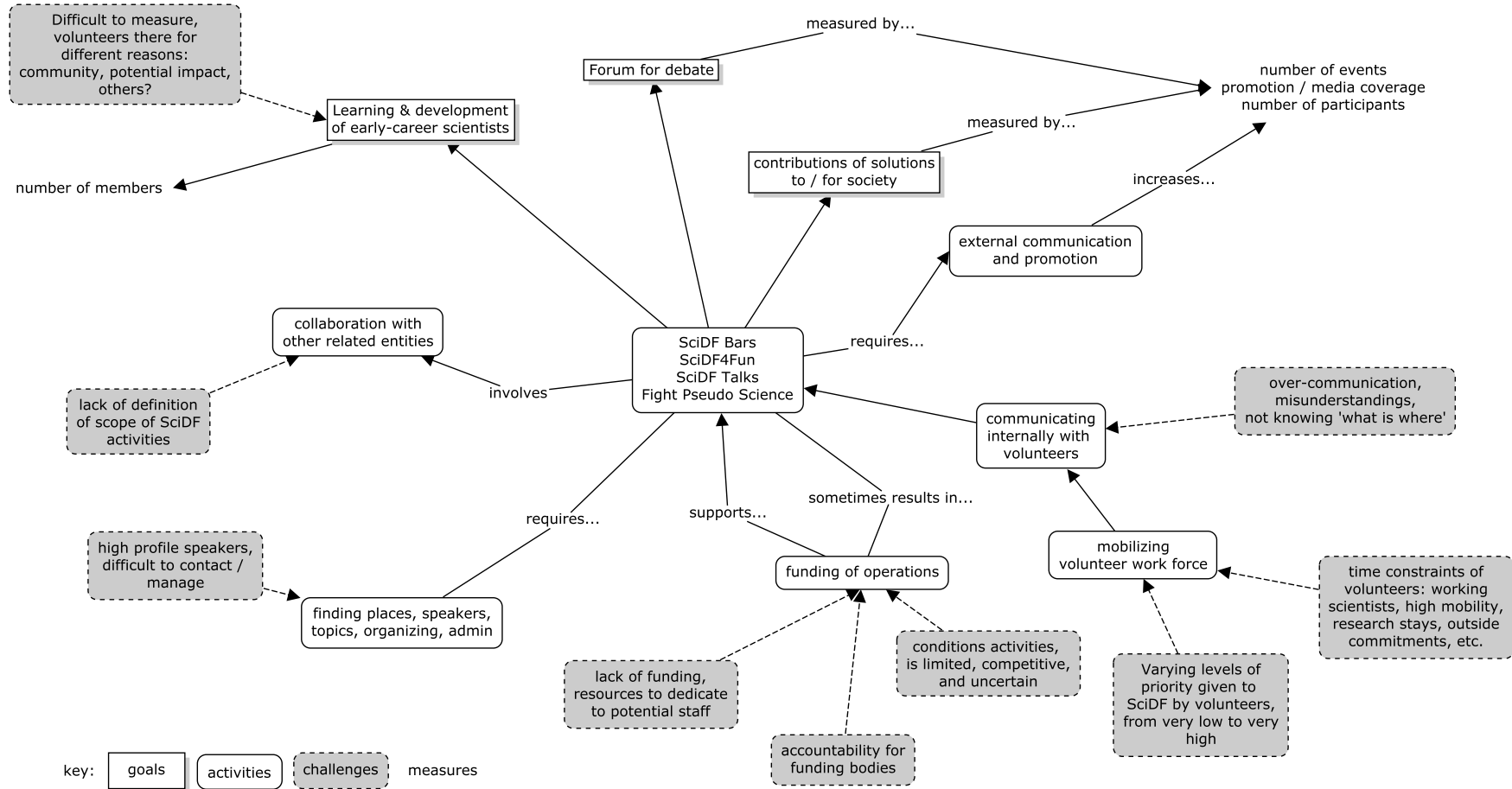
### 4.3.4 Data Analysis

Analysis was an ongoing from the start of the project and began with a stage of "finding out", which centered around the development of rich diagrams such as that in Figure 2. As the investigation went on, additional issues were included in a diagnosis table and in diagrams used for discussion, such as a difficulties with funding, internal communication issues, issues with scope and boundary, a challenges communicating performance for feedback. Following Checkland and Scholes (1990, p. 45), no formal technique was used to create the diagrams.

Also during analysis, and as a precursor to an in-depth examination of potential mechanisms, a number of relevant systems were modeled using CATWOE analysis.

**Figure 4.3:** A model of a system for measuring and managing performance



Performance measurement & management system

A system owned by SciDF committee, that defines, attributes value to, rewards, collects, communicates, and evaluates performance information related to strategic goals, and which is constrained by limited financial and attentional resources.

related to...

Task Assignment System

System for identifying opportunities

System for financing operations

System for internal communication

1. Appreciation of SciDF goals & strategic direction

2. Developing strategies & plans

3. Defining performance measures & objectives

4. Setting targets & rewards (to groups or individuals)

5. Performance information collected & communicated

6. Analysis and evaluation of performance information

7. Corrective action

8. Feedback & Rewarding

9.. Monitoring

10. Control

**Efficacy:** Information communicated to team leads
**Effectiveness:** Shared understanding of strategic aims and performance
**Efficiency:** Signal to Noise

The ideal model and its related systems are in Figure 3. Several models were developed, but in the end the performance measurement and management system was chosen as the focus of discussion. This choice served several purposes. First, performance measurement and management is an established field of study with an extensive literature base. Second, choosing one broad system to model had a practical purpose as well as a theoretical one: discussing one model across many groups reduced the number of concepts being discussed. It also encompassed many of the observed problem situations and could be easily related to other problematic systems, such as task assignment and identification opportunities, a system for financing operations, and a system of internal communication (See Figure 3).

The system in Figure 3 contains elements of "theory-based" conceptions of performance measurement and management systems drawn from the literature (mainly Ferreira and Otley (2009)), adapted, recombined, or re-envisioned for the purposes of the project based on observations and discussion in the field.

**Table 4.3:** Idealized Performance measurement and management system

| Model Activity | Observations in Practice | Analysis | Possible underlying mechanism | Possible corrective action |
|---|---|---|---|---|
| Appreciation of SciDF goals & strategic direction | Exists | Core' team of SciDF have a deep understanding of the goals of SciDF, including the more ambitious ones that imply coming change. The process is largely informal, through frequent communication from a few active members, but there are also minutes, formal documents, and the webpage that reinforce direction | The evolution of the association means that many formal documents that exist online are out of date. For new volunteers, a lack of induction process means higher ambiguity. Perception of being "thrown into the pot" | Appreciation of the goals seems to work fairly well for more senior volunteers. For new members, a mentoring program, team leads, or instructional document could help on-boarding process |

**Table 4.3 Continued from previous page**

| Model Activity | Observations in Practice | Analysis | Possible underlying mechanism | Possible corrective action |
| --- | --- | --- | --- | --- |
| Developing strategies & plans | Exists | Numerous documents exist and the primary avenue to reach SciDF's strategic goals have been defined, though not in relation to its relatively new ambitions of expansion. Identification of strategic opportunities takes place from time to time during team meetings, but follow-up activities appear limited. During strategic meetings, multiple perspectives on SciDF's goals hinder progress | Large group of opinionated stakeholders complicate sense-making Flat organization structure adds to ambiguity Conflict *having a good time* vs. *getting things done* may contribute to ambiguity at the organizational level, e.g. answering why are we here? | Regular sessions, limited to vetted "core team" specifically for the purpose of strategic control. |

**Table 4.3 Continued from previous page**

| Model Activity | Observations in Practice | Analysis | Possible underlying mechanism | Possible corrective action |
|---|---|---|---|---|
| Defining performance measures & objectives | Exists | Specific performance metrics depend by group and are sometimes clear (e.g., 5 talks per year). Others functions appear to lack specific measures (e.g., fund-raising), while others are developed given a urgent need (e.g., voting project). | Lack of measures likely source of goal, role, and process ambiguity | In relation to the above, take time to set and monitor quantifiable objectives |
| Setting targets & rewards (to groups or individuals) | Informal / ad-hoc | Targets have been set in the context of Talks and the voting initiative, but rewards have not. A few members cite the association on their CVs, and core members have their information up on the website. Informal rewards in the form of recognition takes place in Whatsapp groups, on Basecamp, and to some extent at the events themselves. | In combination of the above, lack of targets mean team may not know when they are doing well, contributes not only to ambiguity but also feelings of injustice (especially for new arrivals) | Regular core team sessions specifically for that purpose. Targets should be realistic, and rewards can likely remain informal, befitting the worldview of the volunteers |

146

**Table 4.3 Continued from previous page**

| Model Activity | Observations in Practice | Analysis | Possible underlying mechanism | Possible corrective action |
|---|---|---|---|---|
| Performance information collected & communicated | Informal / ad-hoc | Largely absent outside of organizers of formal discussions. Without clear measures in the first place, performance feedback is mostly subjective. This has contributed to misunderstanding and missed objectives, especially for communications team | Mixing of communication channels mean subjective performance feedback is clouded with informal communication, creates informational overload | Create dedicated channels of communication Split groups so that communication is limited to those who need to see it Avoid mixing fun channel with not fun items |
| Analysis and evaluation of performance information | Informal / ad-hoc | President, team leaders, and active volunteers . There are extensive notes on the goals but not on follow-up activities. | Contributes to the ambiguity Makes corrective action, feedback, and rewarding more difficult because it must be subjective | Emphasize revision of objectives along with identification and pursuit of new opportunities |

**Table 4.3 Continued from previous page**

| Model Activity | Observations in Practice | Analysis | Possible underlying mechanism | Possible corrective action |
|---|---|---|---|---|
| Corrective action | Informal / ad-hoc | How performance is monitored and responded to depends on each activity and organizational group, but is often either highly reactive or non-existent. President often has to intercede which contributes to a number of problems: angst on the side of the volunteers, limited time for him to manage organization. | Lack of reflection on explaining why or why not of performance Ultimately hinders organizational learning | Depends on team, but most volunteers used to high degree of autonomy, so 'leaving it to them' may be most appropriate in combination with other elements. A focus on empowerment from leadership as opposed to performance control and stepping in has been suggested. |

148

**Table 4.3 Continued from previous page**

| Model Activity | Observations in Practice | Analysis | Possible underlying mechanism | Possible corrective action |
|---|---|---|---|---|
| Feedback and Rewarding | Informal / ad-hoc | See above. As an association made up of volunteers, rewards of some type are critical for maintaining motivation and commitment, two areas that SciDF has struggled with. Positive and negative feedback is communicated publicly via Whatsapp and Basecamp, meaning it can be lost through information overload. | Information overload lessens effects of both positive and negative feedback Both feedback and rewards are often tied to subjective or unclear measures; may amplify reactions to ambiguity A great amount of feedback is shared with group, which may intensify sense of injustice | More formal recognition of efforts (awards, team ceremonies) Reduction of information exposure through 'siloization' Clear measures and established frequency of review, along with empowering environment described for corrective action |
| Monitoring | Does not exist | The activities around performance measurement and management are largely informal. Therefore, monitoring of the system itself is mostly non-existent, or relegated to ad hoc, infrequent review. | Lack of formal monitoring recognized by team as due to newness and fast evolution of the organization itself | Expected to 'self-correct' with other corrective action |
| Control | Does not exist | See above: Monitoring | See above: Monitoring | See above: Monitoring |

**Table 4.3 Continued from previous page**

| Model Activity | Observations in Practice | Analysis | Possible underlying mechanism | Possible corrective action |
|---|---|---|---|---|
| | | | | End of table |

Further analysis of the process is presented in Table 3 and represents the outcome of an initial process of comparison of the ideal (goals) and what was observed and described. This table references the elements of the model (Figure 3), whether the element was observed in practice, and a description of it according to the theoretical framework. Possible underlying mechanisms are also included along with potential corrective action.

**Figure 4.4:** Identified Mechanisms leading to corrective action
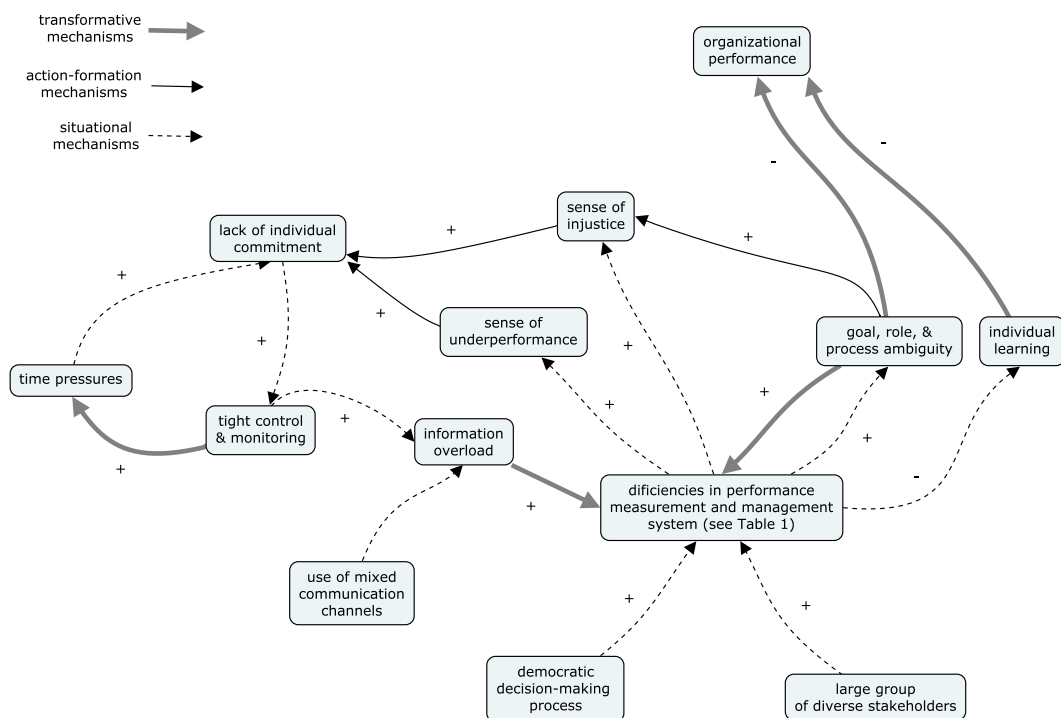


Figure 4 presents the final explanation of the problem situation as it relates to SciDF. These employ the mechanism types of Hedström and Swedberg (1998), arranged around an inter-individual level of analysis (Brante, 2001).

Central to the problem situation were a large, diverse group of stakeholders and an attempt at a democratic decision-making process, which were contributing to deficiencies in the performance measurement and

151

management system elements in Table 2 and Figure 3. These deficiencies perpetuated and reinforced a lack of process, role, and goal clarity and impeded individual learning. Certain elements of the system, *e.g.* a lack of clear targets and recognition, appeared to contribute to a sense of under-performance and a lack of individual commitment, especially with certain groups of volunteers. Lack of commitment and missed (implicit or subjective) targets influenced the leadership, who would monitor whether tasks had been completed on team communication channels. What resulted was a sort of vicious cycle in which the information overload further clouded the feedback information that was being communicated.

Suggested corrective action is included in Table 3 and is based on the mechanisms represented in Figure 4. For example, the suggestion to hold regular review sessions for the directing committee with specific, quantified targets is based on a the idea that these can make inform action, decreasing ambiguity, and also appeals to a sense of fairness. An improvement in this area could then in turn increase volunteer commitment to the organization and, ultimately, improve its performance.

## 4.4 Discussion

This article puts forth that SSM essentially offers an effective means of resolving and redescribing complex organizational realities, and for arriving at action plans for implementing change. The point of approaching SSM from a critical realist perspective is to maintain its positive aspects—a commitment to bringing about positive change, appreciating complexity and the perspective of multiple stakeholders—but also to augment these in a way that allows for introducing and developing existing knowledge. The following paragraphs discuss how critical realism might bring this about with reference to the case study, and possible tensions that may arise as a result.

Second, adopting the RRREIC process offered a manner for addressing the underlying *how?* and *why?* of problem *solving* through a focus on generative mechanisms and conditioning structures. Indeed, researchers

have noted that while SSM can provide an ideal vehicle for redescribing an issue, *i.e.* at arriving at the question to be asked, it provides little guidance for how the issue can be addressed (Hanafizadeh and Mehrabioun, 2018). In remaining epistemologically relative, the critical realist approach does not dictate the use of a particular method *a priori* and so there are many possibilities for incorporating other methods.

In the described case study, interviews and observation served to develop an initial assessment of the problem situation, which was validated at several stages by participants of the project. Other, more intensive methods are certainly possible and may have been beneficial to the project, which was ultimately limited to the interpretations of the researcher. Indeed, attempts at using SSM to develop theory typically employ multiple research methods (Hanafizadeh and Mehrabioun, 2018). However, doing so without adopting an explicit philosophical position from which to operate can result in logical inconsistencies (Smith, 2006).

Finally, critical realism offers a means of reconciling multiple mechanisms operating at multiple levels. While SSM focuses on organizational problems The case has presented only one, fairly uncomplicated view of mechanisms which has been described as the "inter-individual" level (Brante, 2001). While this is useful for illustration and appropriate given the nature, it should be noted that expanding this idea to other types of mechanisms operating at other levels would yield more complete explanations. Therefore, possibly in combination with other methods, the continued exploration of stratification could provide a means of making SSM more accessible to a wider range of practitioner–researchers, and to make it more suitable to even more complex problems that require multi-level, multi-disciplinary studies to address.

The case also demonstrates one possible method for systematically introducing outside knowledge into the system, and thereby addresses concerns about the assumptions of SSM being regulative (Houghton, 2002; Jackson, 1991). In the case study, a literature review was fit for this purpose and aided not just in redescribing the problem situation in theoretical terms, but also as a process of co-discovery. In this way, in

addition to discussing desirability and feasibility, theories of possible action were also considered in terms of their plausibility.

Therefore, it could be argued that there are three major benefits to be gained through a critical realist approach. First, that a critical realist approach to SSM benefits development of management as a science by deliberately incorporating existing knowledge into the treatment of problematic situations in a critical manner. Next, that a critical realist approach benefits SSM in practice in maintaining a focus on its transformation and by recognizing the social, physical, and imagined mechanisms and structures. Finally, that a critical realist approach benefits SSM in that it provides a foundation for its ongoing evolution, initially by remaining epistemologically relative.

However, in pursing a dual purpose that seeks to transform practice and develop knowledge, potential tensions arise that would not otherwise be present with a strictly phenomenological perspective. These purposes may well serve each other, as understanding the former will help develop the intervention to bring about the desirable change. In these cases, the primary objective of SSM as a means of addressing a situation that is viewed as problematic (Checkland and Scholes, 1990) can be maintained.

On the other hand, pursuing a dual purpose is also perhaps the most dramatic deviation from the original vision of SSM, in that it could be seen as promoting the instrumentalist application of knowledge that Checkland (1980) set out to avoid (Flood, 2000), and at risk for employing theory in a way that leads to "not seeing" (Poggi, 1965). Checkland is clear that any intervention should consider the views of all stakeholders, as both meaning and the solution must come from the people involved in the problem situation (Checkland and Scholes, 1990). Therefore, the researcher must again find a way to combine the search for and identification of mechanisms, maintaining a healthy skepticism of the results, and arriving at practical solutions. This coincides with a need to balance the demands of being an outsider and an insider, where the former may emphasize results for theory and the latter results for the organization

(Suomala *et al.*, 2014). In the case study, balance was sought mainly by actively involving participants in defining the problem and developing an action plan.

There is also an issue concerning criteria for judging the "validity" of the identify mechanisms. For the localized results of the case study for theory, it does appear that results are significant for performance measurement and management and could contribute to explanation building in that field, albeit with further exploration and development. The elimination, identification, and correction stages were achieved through comparison of the models, open debate, and reflection, and these processes were accompanied by the development and maintenance of a "diagnosis database". Results fit with some extensive works in the field of performance measurement and management, *e.g.* that a lack of clear measures can be a source of ambiguity (Hall, 2008) and contribute lead to feelings of injustice (Wouters and Wilderom, 2008). Apart from discussing the theories with the study participants, Kempster and Parry (2014) have argued that one way of evaluating proposed mechanisms is through publication, which carries the added benefit of potentially making the results of SSM studies more accessible to be applied in other contexts.

Also, the need to constantly apply the results of the literature review generated some interesting results in itself. For one, many of the studies needed to be re-interpreted in order to fit the critical realist approach. The review of Van Camp and Braet (2016) that served as the starting point is exemplary: not all the listed sources of failure came in the form of generative mechanisms, and so converting these into a usable form for applied research required some effort and interpretation along the lines of realist synthesis (Pawson, 2006). This process also fit well within the SSM methodology in that it served in redescribing the problematic situation as well as in comparing the actual and the ideal.

An additional benefit of this process is that it demonstrates a practical means for achieving what Bhaskar (2016) refers to as the principle of hermeticism, *i.e.* that theories should be tested in everyday life. This

has potential to further benefit research directions, in that the immediate demand to offer an immediate practical solution as a part of SSM requires a grounding in relevancy. Thus, researchers adopting SSM as a methodology for applied work will likely follow lines of inquiry relevant to practitioners.

Concerning the correction of previous findings in the localized setting, the extent to which the study revealed an accurate conception of the mechanisms at work is open to debate. At a practical level, and adopting the "insider view", results were used in the development of an action plan, so the objectives of SSM have been met to some degree in that consensus on the nature of the problem and potential resolution was achieved.

However, it is unclear the extent to which that action plan would generate the desired results, and which of these, if any, could be attributed to the mechanisms that were identified, or to the method itself as a tool for self discovery. In this way it appears that SSM as described by (Checkland and Scholes, 1990) is limited on its own in its ability for theory-testing outside of practical adequacy (*e.g.*, performance improves) and confirmation by the stakeholders. There is therefore an opportunity to incorporate other methods to facilitate this process.

## 4.5 Conclusions

This paper explores the implications for adopting a critical realist approach for research that employs soft systems methodology. The discussion is somewhat limited in that it has presented a relatively narrow and uncritical view of critical realism. There are many perspectives and debates within realism and critical realism, and adopting one of these or another might demand modifying the design of method. However, as with soft systems methodology, the illustrative case study presented is meant to demonstrate one possible manner to undertake a critical realism-inspired project.

There is an opportunity to further develop a union of critical realism and SSM. First, this study has paid little attention to concepts of bound-

ary, level, and mechanism type (Brante, 2001). Elaborating such a union could be especially useful in expanding SSM to a wider range of contexts because considering these generally requires a multidisciplinary approach. It could also facilitate the incorporation of other methods into SSM and thereby address limitations to achieving open and meaningful debate (Jackson, 1991), and to further develop criteria for evaluating mechanisms (Robert Isaksen, 2016).

This paper demonstrates how a soft systems approach is compatible with a critical realist foundation through an applied research project. By adopting a realist ontology, researchers employing soft systems methodology can pursue practical relevance, appreciating the central role of meaning in social interactions, but also seek to develop explanations that can potentially extend beyond a given research context. Though a balance must be struck between the goal of theory-building and relevance within the study, the original goal of soft systems methodology, bringing about improvement in problem situations, can be maintained, but also potentially enhanced through the active development of explanations. Such a position therefore represents one possible path to bridge the research–practice gap.

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# Chapter 5

# Conclusions

The aim of this thesis is to explore the implications of adopting a critical realist position for studying PMM. This chapter summarizes the principle arguments of the thesis: that there are consequences for *describing* PMM and for learning about it, and that these may be reflected in developing methodologies to build knowledge in the field.

Table 5.1 summarizes each the contributions of the thesis in relation to the initial objectives. In the following section, these are explored in more detail by reviewing the implications of each chapter, along with the limitations of the studies and future research directions.

**Table 5.1:** Summary of conclusions

| Original Objective | Status | Summary of Conclusions |
|---|---|---|
| 1. Present the state of the art of performance measurement and management and the need for a critical realist approach and discuss the implications of such an approach | Achieved | PMM could benefit from a critical realist approach, most immediately of causality and level, which can be used to develop more robust intervention *and* build knowledge |

Table 5.1 Continued from previous page

| Original Objective | Status | Summary of Conclusions |
|---|---|---|
| 1.1 Discuss the implications of approaching PMM from a critical realist stance | Achieved | First, adopting a critical realist approach to PMM requires a stratified and interconnected view of reality that goes beyond a division of social and technical controls. Second, separating ontology from epistemology requires moving from a strictly inductive or deductive approach to discovery to considering an alternative approach to knowledge building (RRREIC). |
| 1.2 Illustrate such an approach | Achieved | Carrying out a RRREIC cycle to develop and study a PMM system highlighted practical benefits to changes in level, in gathering and redescribing entities in a theory-conscious way, and also highlighted the potential benefits of increased cross-disciplinary studies in PMM to better understand the mechanisms of differing types and level which operate within distinct contexts. |
| 2. Consider a process for identifying mechanisms through realist literature review with PMM | Achieved | Chapter 3 presents realist synthesis and its results. In arguing against undue reductionism in meta-analysis applied to social interventions, Pawson (2006) presents an alternative approach which is flexible yet rigorous |

Table 5.1 Continued from previous page

| Original Objective | Status | Summary of Conclusions |
| --- | --- | --- |
| 2.1 Address how and in what circumstances strategy maps work for performance measurement and management | Achieved | The way strategy maps work depends on the level of interest. PMM tends to be interested in their use for structuring problems, developing a system of measurement, or for analysis. Paradoxically, the strongest evidence is for use in structuring and development, where the social activity required can generate a number of benefits. PMM research, on the other hand, focuses on maps for analysis which relies primarily on their visual properties and node–link structure. When linked to rewards these may have undesired effects. 12 Propositions are offered to guide research and practice. |
| 3. Develop a critical realist methodology for identifying PMM mechanisms for transformative practice, i.e. action research | Achieved | Bhaskar's (1993) RRREIC cycle is again applied, this time within a soft systems methology project, which allows for the incorporation and possible correction of existing knowledge |
| 3.1 Elaborate a critical realist approach to soft systems methodology | Achieved | Critical realism can potentially address limitations of soft systems methodology for developing knowledge without sacrificing its positive aspects and appreciation of Weltanschauung. The chapter addresses a key gap in the literature, which was to provide a detailed example of approaching soft systems with critical realism. |
| 3.2 Employ an illustrative case to discuss implications of the approach | Achieved | Applying soft systems in the field requires addressing tension not only between insider/outsider but also between applying knowledge and questioning existing knowledge |

**Table 5.1 Continued from previous page**

| Original Objective | Status | Summary of Conclusions |
| --- | --- | --- |

Source: The author

## 5.1 Chapter 2 conclusions

Chapter 2 explores some of the consequences of adopting a critical realist approach to the study of performance management and how this could help resolve several persistent issues facing the discipline. Like much management research, PMM draws on a number of disciplines to inform its research and there have been several attempts to integrate these approaches. For example, it can be said, as others have (*e.g.* Wouters and Wilderom, 2008), that PMM is first about measurement, but that measurement also involves structuring problems, attributing value, capturing data or "inscribing" (Bürkland and Zachariassen, 2014) those values, and communicating or analyzing these values. This is useful, in that it breaks PMM down to its most essential: its necessary properties.

However, this breakdown alone does not represent a way forward for building knowledge in PMM. Indeed, others have already attempted such a study (Franco-Santos *et al.*, 2007), and issues relating to definitions still exist (Choong, 2014a). Even so, resolving PMM into its components is potentially quite useful, because it paves the way for a "unifying PMM theory" (Choong, 2014b), by reducing PMM to its necessary, observable components without limiting it to a particular context, group, or tool. Past attempts do not address the problems inherent in a multidisciplinary field, with multiple levels of interest and in which even the desired outcome of PMM may differ widely between researchers.

However, as Chapter 2 argues, adopting a stratified view (in both of the critical realist senses) could help to reconcile these challenges. In the illustrative study, conceiving of these components as arising from the operation of generative mechanism at different strata requires largely different theories of mechanisms; one cannot explain the functioning of

a system component by referencing behavior at the system level. Neither is the reverse true: it is not possible to describe the entire system through its components alone. This is the principle of emergence, and Chapter 2 illustrates its importance for the study of PMM. Clearly, the idea of stratification could be developed further, as will be discussed later in this chapter.

Second, the critical realist approach allows for a relativist approach to the discovery process, which need not be at the expense of a deductive, inductive, or abductive approach as is appropriate. That is, no method is favored *a priori*, but can vary according to context. The corollary to adopting a relativist position to epistemology is that it abandons the traditional hierarchy of evidence, which places the randomized control trial at the top (Pearce and Raman, 2014). So an abductive approach can be used to theoretically *redescribe* a situation in which PMM is used, and then retrodiction to antecedent states of affairs. In practice in social sciences, retroduction and retrodiction may operate in tandem, and use induction and deduction to eliminate implausible explanations, and also inference to the best possible explanation (Bhaskar, 2016, pp. 81) Critical realism provides a philosophical foundation to integrate these important processes.

Chapter 2 also has several limitations. First, as is the case with all of this thesis, only a select few concepts from critical realism can be incorporated, and only those seen as most applicable to current debates in PMM have been included. Second, the results of Chapter 2 could be augmented by a deeper consideration of the literature review that informed it. The studies considered are being used to develop a compendium of mechanisms following a process similar to that of Chapter 3. The selection criteria have been included in Appendix B.

Chapter 2 has laid the groundwork for further elaboration of a critical realist take on PMM. The results from this chapter form the basis of an ongoing literature review which is underdevelopment and which will attempt to review mechanisms of PMM according to their level and type.

## 5.2 Chapter 3 Conclusions

The primary objective of Chapter 3 is to present a method for considering the existing evidence base to identify generative mechanisms and develop scientific explanations. To achieve this objective, a methodology called realist synthesis (Pawson, 2006) is presented and applied to the analysis of a critical component of many PMM interventions: the strategy map.

Though not elaborated in Chapter 3, this study found that realist synthesis fits into the critical realist approach of *DREIC*, in that it begins with a process of *description*, moves to *retroduction*, and later evaluates the plausibility of underlying generative mechanisms. Whether and the extent to which realist synthesis as such is entirely compatible with critical realism is largely beyond the scope of this thesis; in any case the philosophical disagreements between Pawson and Bhaskar around structure and agency (Porter, 2015) were not a hindrance in carrying out this work. While a full consideration of the compatibility of the two approaches is outside of the scope of this thesis, it does bring forth an interesting topic for future study.

A compelling argument for the appropriateness of realist synthesis for social science is this: The same authors who popularized systematic review within management studies, Tranfield *et al.* (2003) and perhaps one of the most common citation for systematic literature reviews in management, later advocate for many of the same techniques and use critical realist ideas in their later works (Denyer *et al.*, 2008; Denyer and Tranfield, 2009), including the CMO configurations, which are a feature of Chapter 3. However, these authors opt for a pragmatic position which avoids the realist ontology, and thus the realist view of stratification, causally efficacious social entities, and judgmental rationality, which are seen as strengths in the current studies. This thesis further argues that these elements which are lacking from pragmatism would be beneficial to studying PMM, as has been suggested in recent comparisons of the two paradigms (Allmark and Machaczek, 2018).

Realist synthesis could contribute to other areas of PMM research

because it offers a flexible but rigorous means of analyzing the evidence base that is appropriate for complex social phenomena, in a way that is designed to inform practice. The first implication of such a technique is that it could be applied elsewhere to address persisting challenges in PMM and at the same time increase its relevance. For example, Speckbacher *et al.* (2003) note differing adoption rates of the Balanced Scorecard and various reported benefits, and notes that few organizations use it to the extent it was intended (Kaplan, 2012). Realist synthesis would require breaking the Balanced Scorecard into its components at the level of interest before examining whether or not it "worked", *i.e.*, that it leads to increased organizational performance or not. Indeed, the study described in Chapter 3 originally began by resolving the Balance Scorecard into its components: use of a Balanced Scorecard report, cascading levels, the strategy map, interactive use, *etc.*.

Therefore, realist synthesis could be applied to other well-known PMM frameworks (*e.g.* the performance prism (Neely *et al.*, 2002)) or PMM issues (*e.g.*, implementation) to extract and evaluate mechanisms in a way that appreciates the complexity of the contexts in which these take place. Thus, there is a great potential of the technique to offer refined—or indeed new—PMM theory.

Realist synthesis itself carries a number of limitations and these are present for the study of PMM and in Chapter 3. First, it is labor-intensive compared to meta-analysis and other quantitative-leaning methods. Second, evaluation criteria for adjudication is often hard to come by, because realism criticizes the traditional hierarchy of evidence as reductionist for social interventions. These limitations are to some extent being addressed as debates in critical realism advance (Robert Isaksen, 2016). Therefore, in Chapter 3, arriving at a plausible mechanism involved primarily "inference to the best possible explanation". Given that the primary problem facing strategy map theory within PMM was its lack, the objectives for PMM theory building were able to be met. However, future research could assess the overall compatibility of realist synthesis in its current form with the aims of organizational science,

management, and business studies. Issues with the realist ontology in particular have been cited as hindering the methodology's more widespread application (Dalkin *et al.*, 2015). Based on the results of this thesis, adopting a critical realist approach to realist synthesis—a critically realist synthesis—might be one means of resolving the issue.

## 5.3   Chapter 4 Conclusions

Chapter 4 presents the implications of adopting a critical realist approach to soft systems methodology. The primary benefit, it is argued, is that it allowed soft systems to fit within the *RRREIC* process to knowledge building, and allows a fairly unproblematic (if critical) application of an existing knowledge base.

In the study, following this approach, and especially the combination of retrodiction—essentially, a search for existing knowledge that would explain the mechanisms underlying the problem situation—with retroduction—imagining what could explain the problem situation—quickly brought the researcher to the edge of *what we know*, and demanded asking hard questions which could help increase the capacity for knowledge building in PMM and management. Three of these questions will be considered in relation to the limitations of that study.

First, was the lack of existing theoretical explanations due to the limits of knowledge of the researcher? Given that PMM draws on a number of fields to inform its theories, the chances are high that a perceived lack of mechanisms is due simply to ignorance on behalf of the researcher. Addressing this question suggests that applied research would benefit from active collaborations with other experts, academic or otherwise. In this way, critical realism can address the issue that soft systems methodology has remained too localized (Mingers, 2000a) and also promote a means to make it less self-regulatory (Jackson, 1991).

Second, was the lack or existing theoretical explanations due to theoretical limitations within PMM that might exist somewhere else? This would seem to imply a call for increased interdisciplinary work on PMM problems, echoing findings in Chapter 3 around the theory of strategy

mapping, including more flexible means for conducting literature reviews that allow for spanning disciplines.

Finally, was the lack due to a genuine gap in knowledge? In the *RRREIC* approach followed in the study, a literature base was used and developed to facilitate the process of retrodiction, *i.e.* to use existing theoretical explanations to explain and address the problem situation. Here, when no such theory fit, a retroductive approach could be followed in order to explain and address the problem situation, which could be followed up with inductive and deductive approaches to identify potentially causally efficacious mechanisms. As discussed later in this chapter, such an approach led to several interesting lines of study for PMM and management related to learned helplessness and dependence, which might without a retroductive approach.

The combination of retroduction and retrodiction presents an interesting future line of study. Researchers often equate the terms with abduction (Chiasson, 2005). The results of this thesis suggest that a further exploration of the difference between retroduction, retrodiction, and abduction could be a useful pursuit to more deliberately use each one more effectively.

Also important for management studies and practice is that this process can occur as a part of an action research project. Action research demands a practical solution, and thereby increases the likelihood that such studies will provide knowledge that is relevant. In this way, critical realism and soft systems is a possible means to bridge the theory–practice gap (Panda and Gupta, 2014).

## 5.4 General conclusions

This thesis offers the beginnings of a critical realist approach to the study of performance measurement and management (PMM), and in so doing, offers several new potential directions for research. In concluding, the original research question is considered again:

**Research Question:** What are the implications for adopting a critical

realist approach to studying performance measurement and management?

The thesis suggests that there several implications for studying performance measurement and management. Because critical realism explores philosophical issues, these implications cannot be fully separated from the implications of adopting a critical realist approach to studying *anything*. However, the following paragraphs will center on the overarching implications for PMM in particular, which as described in the introduction faces serious challenges for maintaining its relevance and rigor.

### 5.4.1 Research Implications

The first implication is that critical realism implies abandoning a search for universal laws that seek to connect practice with outcomes, moving from an events-based research approach in favor of a generative, systemic view. Chapter 2 has explored some of these issues, presenting the critical realist argument that the empiricism behind this goal, and its accompanying view of causality, effectively reduces reality to what can be observed or experienced. As discussed in Chapter 3, the type of question behind the goal can be presented as asking "What works?" or "Does it work?". The issue is that this question ignores *how* two events could be related. Therefore avoiding the search for conjunctive events would mean that PMM research would move away from attempting evaluating, say, whether measuring intangible performance improves financial performance (*e.g.* Ittner, 2008) towards understanding and explaining how they might be linked. The move to *how* is critical for informing effective practice.

Carrying on this line of argument, the results of this thesis further suggest that it is not enough to adopt a "contingency theory" that holds that the characteristics of an appropriate PMM intervention or system will depend on a particular context if the empiricist or positivist view is maintained. Such a view is evident in Chenhall (2003): "A contingency-

based approach attempts to map variables and demonstrate potential relationships between these variables, which may include power and politics, and indicate potential links with outcomes" (pp. 160). The risk is that in mapping variables contingency research in PMM could be become an exercise in enumerating variables *ad infinitum*. But as Chenhall (2003) goes on to note, alternative perspectives are "often so ill structured that regularities cannot be meaningfully represented" (p. 160).

It is argued here that adopting a critical realist perspective resolves both issues. First, it allows scientific exploration to move beyond the enumeration of variables to understanding *why* they might relate, *i.e.* of the reality they reflect. This move would require largely abandoning primarily inductive models based on a conjunctions view of causality in favor of the generative model. Second, in maintaining a realist ontology it allows for the structure and generalization that knowledge building demands, and avoids issues with interpretivism and generalization (Smith, 2006) to which Chenhall seems to be referring in the above quote. PMM appears to be well-situated for such a move given an increasing interest in systems theory (Schleicher *et al.*, 2018).

The second implication for the study of PMM follows from the first, and this is that the thesis contributes to an alternative to event-based management study. Part of this alternative suggests that if reality is comprised interacting entities (*i.e.*, if the world is open and complex), and these are further interpreted by human beings, then basing scientific process primarily on inductive methods using statistical inference is problematic. Rather, induction forms a part of a broader process which seeks to identify or understand generative causal mechanisms acting in open systems *in order to* improve practice. This approach has been discussed here in Chapters 2 and 4 under the RRREIC model and alluded to in Chapter 3 as DREIC. There could well be other ways of seeing the scientific process (*e.g.* Chiasson, 2005), but the key implication of critical realism for PMM is that allows for a wide range of methods that center around the tentative uncovering of generative mechanisms. This

implication is interesting because it offers a "middle ground" between empiricism and the interpretivist alternatives which have been presented for PMM to date (*e.g.* Micheli and Mari, 2014) in which induction, deduction, and abduction each have an important role to play. In this way, critical realism could offer a means of unifying what are currently quite different approaches.

### 5.4.2  Managerial Implications

The findings of this thesis suggest one means of moving beyond what Senge (1990) referred to as a fixation on events in management practice. Focusing on events—quarterly earnings, a customer complaint, missed sales targets—begets event-based explanations, and harm the development of more nuanced, multi-layered approaches that are required for learning and successful adaptation (Senge, 1990, p. 21). The concepts in this thesis represent a growing alternative for events based management, and though a deep consideration of critical realist and philosophy of science in general may go beyond the needs of most practicing managers, many of the concepts are of direct use.

These concepts can help managers understand a plethora of management tools and fads and inform their use within their context. A major aim of Chapter 3, for example, was to make the theory of the strategy map explicit and begin to develop a framework to allow it to be adapted to context. The upshot is that performance management and performance management systems can be designed in light and in service of generative mechanisms. The current organizational context, characterized by increasing uncertainty, shifting societal trends, and dramatically increased access to information (Pfeiffer, 2017), makes moving beyond events even more critical because adapting quickly and effectively–essentially, the ability to learn as organizations–will increasingly determine long-term organizational performance.

### 5.4.3  Limitations

This thesis has several limitations.

First and foremost, there is an admitted lack of attempts at generalization using quantitative data, and a discussion thereof, compared to meta-theoretical discussion. This has allowed for greater focus on the challenges faced by PMM discussed in the previous chapters, but it also leaves a pressing need to demonstrate the usefulness of critical realism to research practice. Studies seeking to apply critical realism face a number of challenges. Perhaps most pressing is the need to develop specific guidelines and criteria of evaluation, about which there is much disagreement.

The role of quantitative methods is particularly problematic, with some critical realist researchers largely avoiding them altogether (Brown and Roberts, 2014). Future discussion should aim to resolve these difficulties, which are seen as particularly important to offer a complete discussion of performance *measurement*.

There is a place for quantitative methods following critical realism, even if these often require some adaptation in application and interpretation (Williams, 2014). However, such a discussion is largely absent from the current thesis, which has instead focused largely on contributing to the methodological implications of adopting critical realism. Future research in PMM and management studies in general will need to resolve the issues of quantitative methods and better specify their criteria of evaluation.

In the current thesis, the empirical data is largely used for illustrative purposes. Though these examples draw on actual cases, here their contribution to management theory is minimal–even if it an argument for meta-theory can be made. More empirical work, especially using survey or other extensive research methods, would be useful both for demonstrating such methods from the critical realist perspective and for strengthening the theoretical arguments of the thesis.

Another limitation is that a relatively small portion of critical realism has been considered. Entering further into this discussion would require shifting focus away from PMM, and the primary interest of this thesis remains exploring philosophical issues *in service of* management

research. Therefore, critical realism is largely taken "as is", and the debates within and without hardly considered. It should be recognized, then, that these debates exist (Brown and Roberts, 2014), and that this thesis contributes little to furthering these.

Finally, as discussed in Chapter 4, there was a limit to what could be accomplished as a lone investigator in developing PMM theory. This was mainly the case in the field work described in Chapters 2 and 4. What these limits and this thesis make clear is the need for collaboration between researchers, as it expands the edge of the known beyond the capacity of a single investigator which is difficult to overcome *in situ*.

### 5.4.4 Future Lines of Study

Perhaps the most promising extension of the studies within this thesis are to further contribute to making critical realist ideas accessible to a wider range of researchers. For example, the concept of stratification is still subject to a good deal of confusion.

Therefore, elaborating the idea further could help reconcile the multiple concepts of PMM and how it works. For example, the results of this thesis suggest that there is are important psychological mechanisms for analyzing, say, a report composed of nodes and links (see Chapter 3), but that this analysis cannot be understood without understanding psycho-socio mechanisms of the individual within the organizational context, and generally within a particular group or team, which further requires understanding organizations in a cultural, organizational, and economic context, without mentioning the technical and physical aspects of developing an information system capable of delivering such a report. These are just some of the entities important to developing a fuller understanding of how to develop more robust PMM interventions. An initial attempt at such a development is located in Appendix A, which is currently being elaborated for publication.

An additional line of study developing critical realist methodology stemming from this work is the potential of the *RRREIC* approach. This was found to be highly compatible in both of the applied studies in this

text. Indeed, Bhaskar (2016) notes that rigorous science has always followed an approach along the lines of *DREIC* and *RRREIC*, albeit implicitly.

Curiously, there is relatively little written on either of these despite their potential (Robert Isaksen, 2016), and so there is an opportunity to develop the ideas further to bring them to a wider audience. This is seen as a highly important line of work, because the approach has the potential to build a bridge between groups of researchers who identify as quantitative or qualitative, or inductive or deductive, because the retroductive approach may require abduction, deduction, or induction, depending on the nature of the phenomenon of study. In this way, the developing a discussion of *RRREIC* within management studies has the potential to strengthen it as an *applied science* (*e.g.* Denyer *et al.*, 2008).

Finally, related to critical realism, there is an opportunity to incorporate the critical and social aspects of PMM. This is seen as especially important to the study of PMM within the context of the 4th Industrial Revolution, characterized by increased ambiguity and mental strain for the individual (Dombrowski and Wagner, 2014), but also the potential for drastic changes in the capacity for performance measurement to affect organizational practice and society, not all of them positive. The potential for PMM to be used in a coercive or oppressive manner has increased with advances in technology (Newsome *et al.*, 2013). Critical realism could add to this discussion by incorporating ideas of structure and agency, the aims of science, and its critical nature, ideas which could not be elaborated in the current discussion.

This thesis originally set out to explore the implications for critical realism for knowledge building in PMM. Despite limitations, the articles presented in this thesis meet these objectives, and present original contributions to the field. Exploring these philosophical issues presents an interesting way for building knowledge in a way that is rigorous, but also presents a means for ensuring that it is also relevant and meets the requirements for practical adequacy. Critical realism is one means to do this; it may not be the only one (Williams and Dyer, 2017). How-

ever, the studies described in this thesis resulted in methodological and empirical contributions that were founded on critical realism. Now, the challenge and opportunity is in putting these approaches to good use to contribute to the development of robust and useful theory, not just for performance measurement and management, but also for organizational and management studies in general.

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# Appendices

# Appendix A

# An illustration of laminated systems

The concept of generative mechanisms and levels has generated some confusion amongst researchers (Astbury and Leeuw, 2010). Therefore, this appendix contains supplementary information which, for space limitations, could not be fully developed in Chapter 2. This graphic forms a part of an ongoing literature review on the mechanisms of PMM and is meant to enhance the description of Chapter 2.

Figure A.1 shows different levels of social mechanisms, classified according to the levels of Brante (2001) and further elaborated in Bhaskar and Danermark (2006). Brante (2001) uses the terms "international", "interinstitutional", "institutional", "inter-individual", and "individual" to describe levels of social mechanisms (physical mechanisms are not included in Figure A.1 but also have distinct, emergent levels). These words refer to distinct levels of social entities. Under the critical realist perspective, these entities are real, and can be studied as such, in the sense that they are causally efficacious (Mingers, 2014).

Mixing these levels inappropriately or unconsciously is a form of the epistemic fallacy (Bhaskar, 1975) in that may result in logical inconsistencies and unsatisfactory explanations. At the same time, the figure shows different types of mechanisms: physical, biological (physiological, medical, or clinical), psychological, psycho-social, socio-economic,

**Figure A.1:** Laminated Systems

O → Overlying Context
  I → Level of interest
    U → Underlying Mechanism

Different levels of social mechanisms, starting with the individual. Mechanisms operate at distinct, stratified levels. What can be considered 'context', and 'mechanism' depends on the level of interest.



Bi-dimensional arrows illustrate   types, which can be physical, biological (physiological, medical, or clinical), psychological, psycho-social, socio-economic, cultural, and normative (Bhaskar, 2010).
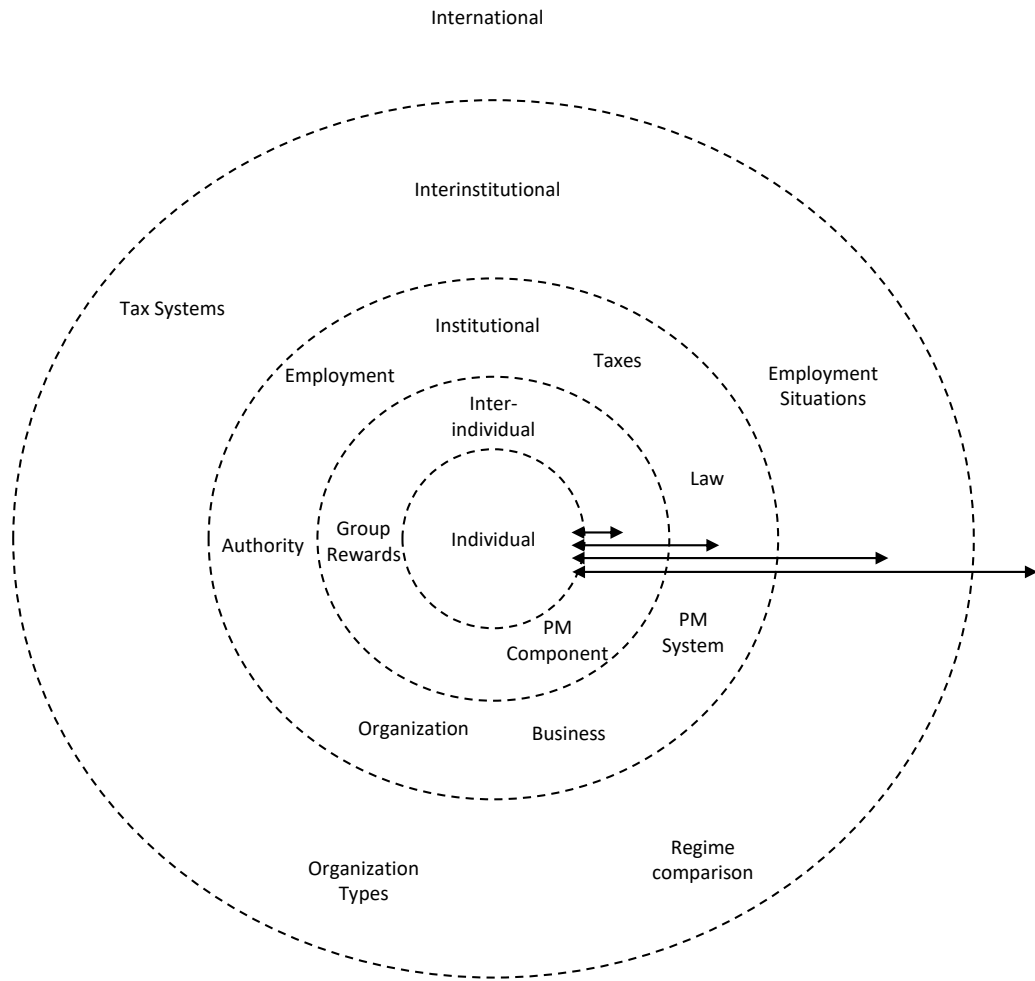
Source: The Author. Framework adapted from Brante (2001) & Bhaskar (2010, 2016)

186

cultural, and normative (Bhaskar and Danermark, 2006). And deeper still, social being involves material transactions with nature, social interactions between humans, social structure proper, and stratification of the embodied personality (Bhaskar, 2010, p.9)

The arrows represent different types of mechanisms in relation to the individual and is based on (Bhaskar and Danermark, 2006), and Brante (2001). For the sake of simplicity the mechanisms types at each level (e.g. between institutions and nations or the self and the subconscious) have not been included. Further, this figure only represents what was seen as relevant to the study; levels of issue will differ depending on the topic of study and its nature.

Importantly, this illustration of levels is broader than that of Hedström and Swedberg (1998)—a common framework for generative mechanisms—by including more levels and highlighting that the concept of mechanism and context depends on the level of interest. In this way, it is similar to the microfoundational explanation (Linder and Foss, 2018), which emphasizes explaining Level $N$ through understanding of Level $N - 1$. However, the microfoundational explanation focuses less on the interactions between levels, for example, of the effects of neo-capitalism on performance measurement system characteristics, instead focusing exclusively on social entities and individual action (Felin *et al.*, 2015).

For an illustration of the analysis of climate change using the critical realist perspective of level, see Bhaskar (2010).

# Appendix B

# Gathering evidence on performance measurement and management

This section presents the methodology informing Chapter 2, which began as a systematic literature review as described below.

## B.1  Methodology

The following section describes the search, selection, and coding procedures that formed the basis for resolution and redescription. The method adheres to realist evaluative practices for abstraction and collection (Pawson, 2006; Wong *et al.*, 2013).

### B.1.1  Search Processes

The objective of the search for primary materials was to produce a representative sample of recent research in PMM. A title, abstract, keyword search for "performance (measurement OR management)" in the Scopus academic database produced an initial list of titles and abstracts to be

reviewed against the selection criteria below.

The initial definition for performance measurement was drawn from Neely *et al.* (1995) as "the process of quantifying the efficiency and effectiveness of an action" (p. 80). This definition was sufficiently broad to allow a wide range of conceptions of PMM to be included in the review.

### B.1.2 Selection Criteria

Selection criteria was applied in three phases: title review, abstract review, and full-text review. Articles were included if they met the following criteria:

- Describes processes, features, and roles of quantifying the efficiency or effectiveness of an action

- Takes place within an organization

- Performance is measured in order to improve some aspect of organizational performance

- Describes an intensive empirical study[1]

- Is published after Jan 1, 1992 (Results to Jan 1, 2016)

- Results in English

- Results are in peer-reviewed journals

### B.1.3 Analysis and Coding Procedure

The full text of each selected article was reviewed. An extraction form (Box 1) was used to gather relevant data and to facilitate the process of abstraction (Pawson, 2006; Tranfield *et al.*, 2003).

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[1] Sayer (1992, p.243) distinguishes intensive from extensive studies in several ways, including the types of research questions put forth, accounts produced, and typical methods used. Intensive research is typically concerned with questions of causality in a limited number of cases through studies of individuals acting in the context of interest.

Box 1. Summary of extraction form
- *Demographics:*  Author, year, title, source
- *Method:* The methodological approach per the authors.
- *Data Collection*
- *Analysis Technique*
- *Location(s) of Study*
- *Context:* Depending on level, institutional characteristics, contemporary events, location
- *Outcome:* The outcome sought through PMM
- *Proposed Mechanism:* A description of the (implied) mechanism explaining how the outcome would come to be.
- *Actors:* A description *of* those involved in the performance measurement initiative and their role.
- *Principle Findings:* A summary of the findings of the study.
- *Definition PM / PM System:* If present, the definition of performance measurement.
- *Theoretical Grounding:* If present, a description of the ordering framework used by the researchers
- *Type of Mechanism:* Using Astbury & Leeuw (2010)
- *Comments:* General comments about the article or study.

Accounts of PMM were coded using the Atlas.ti software package in the following way: First, a data-driven approach (Boyatzis, 1998) was used to create an initial classification of structuring, development, use, and outcomes, which took place as a part of a larger review of the effects of the Balanced Scorecard. Next, the results and discussion of each article were reanalyzed using the data-driven code. Roles, processes, features, and outcomes were coded under the new classification scheme.

## B.2  Results

This study presents a resolution and redescription, drawing on results from a systematic literature review on PMM initiatives within organizations. The review included 57 articles on performance measurement interventions that were coded thematically, following a process of realist synthesis as described by (Pawson, 2006).

The results were used in conceptualizing PMM stages as presented in Chapter 2 of this thesis, and also in an ongoing review which classifies PMM mechanisms according to their level.

# Appendix C

# Chapter 3: Interview Guide

**Interview Guide**

Guide for semi-structure interviews used in the case studies described in Chapter 2 and 4.

**Introducing the Project**

I am ......, a researcher at the University of Barcelona. We are trying to better understand how organizations like _____ do and do not achieve their goals. We are trying to better understand how information systems can break down and how to fix these as organizations such as _____ try to achieve their goals.

The interview should last around 30 minutes.

At any point if you'd like to reach out to me with questions feel free: you can do so via email or by phone any time. I welcome thoughts and feedback!

So, I'm going to use what we talk about here to create a series of diagrams which I will provide to you. To do that, first we'll talk about the organization you work for, and then we'll move on to your particular role within it.

**Part I: Roles, Social Characteristics, and Power-related aspects of problem**

**Objective: CATWOE, Rich picture, and Strategy Map** Introductory questions:

- What is your position at _____?

- How long have you been doing _____?

- Who do you report to?

Questions about strategy:

- Could you tell me a little bit about what _____ does? What are its goals?

- How do you (personally) judge how well _____ is doing?

- Where do you think _____ is headed?

- How has it changed since you arrived?

Questions about individual role in achieving strategy:

- What about you? What are your goals at _____?

- How do you know how well you are doing?

- Who tells you?

- How well do you feel that evaluation is fair?

- What information could help you do your job better?

# Appendix D

# Participant Invitation: Soft Systems Methodology

## Overview

[1]

Soft Systems Methodology (SSM) offers a unique way to address problematic situations in highly complex environments, using visual, participatory techniques that increase cohesion and understanding. Where traditional management consulting and research tends to take "top-down", "one-size-fits-all" approaches, SSM is inclusive *and* scientific: it appreciates the complexity without drowning in it. SSM works by jointly visualizing a real, problematic situation, identifying and constructing idealized models of purposeful activity, and then comparing those with reality. This comparison of the real–ideal forms the basis of action plans to improve the problem situation.

## Background

SSM is one of many techniques used as a part of the evidence-based management movement. It was developed by Peter Checkland and a group of researchers at the University of Lancaster in the 1960s. These

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[1]A version of this text was sent to potential participants in preparation for carrying out the research in Chapter 4 using soft systems methodology.

researchers sought to manage scientifically, but were unsatisfied with the results of their application of "classical" scientific techniques. These did a poor job of appreciating the immensely complex and open nature that characterizes organizational activity. Worse, they were often applied in a top-down manner, where the researchers played the role of "experts" and minimized the inputs of the people acting within the contexts being studied. No wonder that engagement from all but a select few was often minimal and solutions were sub-par, piece-meal, and quick to become obsolete. Surprisingly, this type of top-down, "management by the experts" still characterizes the vast majority of organizations today.

From these beginnings, SSM evolved into its current form through trial and error from an increasingly large group of research-practitioners. With its focus on co-constructing meaning, it has had special success in the field of information systems.

**Project Proposal**

This research project has two objectives. The first is to understand how the information systems that feed understanding about organizational performance can break down. Ideally, people working in organizations engage in activities that ultimately increase organizational performance, whether that be taken as increasing revenue, engaging more people, etc. In principle, the more concerted action directed at these goals, the greater performance will be. In a sense, the members of the organization are like rowers in a boat. If each rower puts their effort in the same direction, the boat moves accordingly. We call this alignment.

On the other hand, if the rowers try to go in different directions, there can be problems. So, alignment can break down when people fail to understand their role as a part of a team.

*This is the problem situation of interest to the project, which assumes that, even in the best of cases, alignment is never perfect.*

The second objective of this project is to improve SSM itself, bring it

more in line with social scientific methods.

**What's Involved: Soft Systems Methodology**

SSM is not a linear process; there is no secret formula for completing it, nor a series of checklists. However, for research participants, the project will involve the following over approximately one month:

1. An initial interview with the "project owner" to define the problem situation in a broad sense

2. A follow-up interview in which a rich diagram is co-created to represent the situation

3. An interview of the team members involved in the problem situation (or at least key players in different teams)

4. Follow-up to with each member to create 1) cognitive maps of their role in the organization and 2) an ideal model of what their "system" does

5. A session in which desirable and feasible changes are discussed as a group

In addition, any opportunity for observation will contribute to a more complete representation of the problem situation, and to the development of more appropriate solutions!

**Outputs:**

1. A rich-diagram of the organizational strategy and associated challenges (Steps 1 and 2)

2. Cognitive maps for each interviewed team member, representing their place in the organization

3. Ideal models for each team or function, along with performance measures
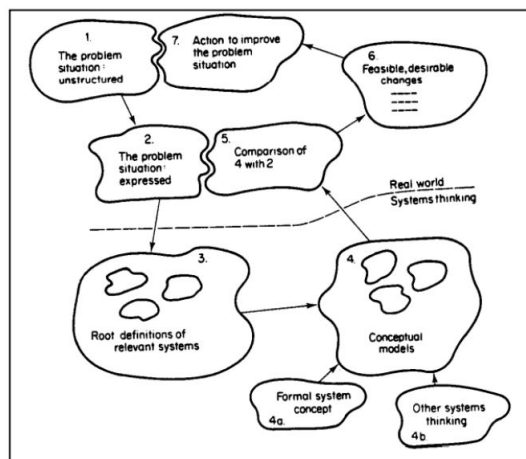
197

4. A "theory and practice-informed" list of possible contributors to the problem situation

5. Action-items presented and discussed with all participants.

   If the project meets with success, there is a possibility to repeat the cycle to better address the problem situation. Please feel free to contact me with any questions.

Thank you for your interest, and I look forward to hearing from you soon!

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**Figure D.1:** A soft systems-like process

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